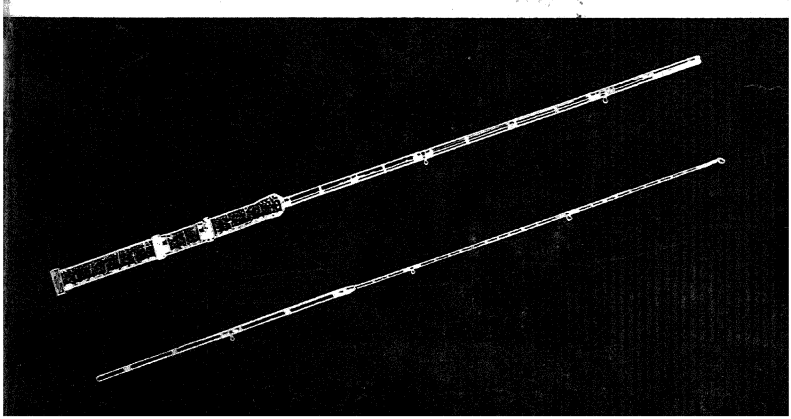
Making fishing rods as a hobby

HARRY BROTHERTON



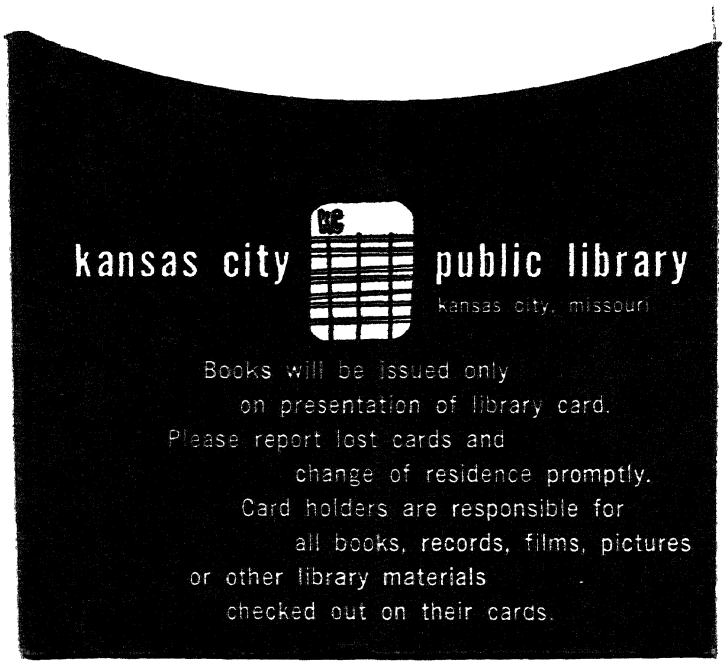
ANGLING today can be an expensive business. The days are gone when a man could set himself up as a 'Compleat Angler' for no more than a five-pound note. Nowadays that sum would hardly buy a decent rod and few modern anglers are content with just one rod when there are so many branches of the sport to be enjoyed.

Every year more and more of Britain's two million anglers are trying to cut the cost by making their rods themselves, but often with disappointing results due to a lack of the necessary 'know how,' for among the vast literature that has been written around angling there is comparatively little about rod-making.

This book fills a long felt need for a really lucid, step-by-step guide to this interesting and profitable craft. The author, Harry Brotherton, is a well-known angler and keen amateur rod-maker for twenty years, who is a frequent and popular contributor to numerous angling and other journals. He has an inventive mind and a knack of making the most abstruse technical matters easily understandable. Although he is a precision-engineer he does not lose sight of the average amateur's limitations. In a non-technical way and with a wealth of explanatory drawings he shows the would-be rod-maker exactly how the job is done, with the simplest of tools and methods. His bench devices are at times revelations of function with simplicity.

There is something in the book, too, for the more experienced amateur rod-maker, in the way of gadgets which the author has devised to overcome certain of the amateur's problems. With this book before him the average angler can hardly fail to make at his first attempt a rod worth taking to the waterside.

59 line drawings
8 photographs



Making Fishing-Rods as a Hobby

HARRY BROTHERTON

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A Practical Guide to the Craft of Rod-Making

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TO

my very tolerant wife, who for
years has swept up the shavings!

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Introduction

Even if you can well afford to go out and buy them there is a lot to be said for making your own fishing-rods. In the first place, if you are a normal sort of a person you will get quite a lot of enjoyment out of making them, for we all have the creative instinct to some degree, and there is always a deep satisfaction in making 'something from nothing', so to speak. I must have made scores of rods in my time, yet I still get a lot of pleasure out of the fashioning of an elegant fishing-rod from an unpromising assortment of raw bamboo cane.

Then again, when you make your rods yourself you get exactly the rods you want—or, at least, it is your own fault if you do not. You can incorporate all the features you like and eliminate all those you do not, for unlike the manufacturer you do not have to cater for the varying tastes of the widest possible market. You have only yourself to please!

Perhaps most important, however, to most of us, is the fact that you can make rods far more cheaply than you can hope to buy them in a shop. Rod-manufacturers would like us to believe otherwise, of course, but it is obvious that your home-made rods are *bound* to be cheaper. You have no profits to make, wages to pay, or overhead charges to cover, nor is exorbitant purchase-tax levied on rods you make yourself. Your only outlay is the bare cost of the raw materials. You will, of course, have to buy the few simple tools necessary if you have not already got them, but once you have acquired these you can go on making fishing-rods for the rest of your life at a mere fraction of the price you would pay for them in a shop.

In trying to dissuade us from making our own rods the manufacturers would perhaps do better if they took their stand on quality, rather than cost, for one must admit that the majority of home-made rods one sees at the waterside are pitifully crude and unlikely to arouse any enthusiasm for home rod-making. The reason for this, I think, is that so many anglers just buy an assortment of canes and

set about making themselves rods without first acquiring the necessary 'know-how'. If the job is tackled in the right way there is no good reason why the amateur should not eventually produce rods every bit as good as the gleaming examples we see in tackle-shop windows.

Mind you, I am not saying that the amateur can start right from scratch, and at his first attempt equal the work of craftsmen who have been at the game all their lives. *Good* rod-making is skilled work; it would be misleading to say that it is not. Yet there is no reason why the average handyman should not manage it successfully. After all, it is no more difficult than many of the skilled handicrafts which amateurs cope with so successfully. The only difference is that much has been written about most of the hobby-crafts; comparatively little has been written about making fishing-rods. I know of many amateur rod-makers, some of them untrained professionally in the use of tools, who can produce really beautiful rods which will bear comparison with the best made anywhere. It is all a matter of practice.

Now this does not mean that you will have to practise for months, scrapping materials and accumulating a houseful of 'white elephants', before you produce a rod worth taking to the waterside. If you possess just a modicum of skill with simple tools you should produce at your first attempt a rod which is at least serviceable. If you then feel that you could do better you can always dispose of your first effort to some less discriminating angler, probably at a profit, and then try again. Thus is rod-making experience acquired.

One big advantage nowadays is that you can learn your rod-making gradually. Certain tackle-suppliers have bowed to the 'do-it-yourself' trend and now market rod-building 'kits' in varying stages of completion, ranging from parcels of selected raw materials to partly built rods which need only the addition of line-rings and varnish. Nowadays you can undertake just as much of the work as you feel capable of carrying out successfully.

This kit system is very convenient if you just want to make yourself an inexpensive rod with the minimum of trouble, but it must be remembered that the more work you have done for you the less your financial saving is likely to be. If you intend to make a hobby of rod-making it is much more satisfactory to work right from rock-bottom, buying your materials piecemeal, an item at a time as and when you need them. You can buy canes one week, corks another, and ferrules and fittings as the need for them arises. You spend no more than a few shillings at one time, yet before you know it you have a handsome rod worth several pounds which does not *seem* to

have cost you anything at all! It is certainly a most attractive way of acquiring a comprehensive selection of good fishing-rods.

I first made a rod about twenty years ago, a float-fishing rod for a boy. It was not a very elegant affair compared with my more recent efforts, but it caught fish. In fact, it is still catching fish today. I have lost count of the number of rods I have made since, for there is a peculiar fascination about rod-making. Once you have made a rod successfully you go on making them, until it becomes necessary to dispose of some of them or the house becomes positively cluttered with fishing-rods.

Disposing of them is usually no problem at all. The problem, I usually find, is having enough rods to dispose of! I never solicit orders, yet I get requests for more rods than I can ever hope to make in my spare time. As you become more expert at the work you find yourself becoming increasingly popular with your angling friends. They buy you drinks and take you out in their cars in the hope that you will supply them with a couple of good rods for the price they would normally pay for one. If you persevere and try conscientiously to make each one a little better than the last there will come a time when your rods will command something like the prevailing shop prices, and if you are prepared to devote the time to it you can make your hobby quite a profitable sideline. In fact, on reaching the age for retirement, many an amateur rod-maker has found his skill at rod-making as good as a substantial pension.

There will always be a market for the 'bespoke' fishing-rod. If the standard is comparable and if it is not going to cost him any more an angler will always prefer a rod that has been made especially for him, and not for any Tom, Dick or Harry who cares to walk into a shop and buy it. He can have it made exactly as he wants it, with the particular fittings he prefers and with the bindings in his favourite colours.

My aim is to make this book a practical step-by-step guide to the craft of rod-making. There may be better ways of doing some of the work, but I intend to confine myself to methods which call for the minimum of skill and equipment, for all would-be rod-makers are not craftsmen and comparatively few will have well-equipped workshops.

I do not intend to go deeply into the technicalities of rod-design, for that subject has already been covered in another little book,[1] by an author far more qualified to deal with technicalities than I am. In any case, first-class rods are constantly being made by amateurs

[1] *Rod-Building for Amateurs*, by Richard Walker. (Bellfield and Bushell.)

not technically minded, who probably would not know a test-curve if they saw one. For convenience I will include the principal dimensions of one or two rods, representative of their types, but if you want to make some other rod you can always get around the problem of design by duplicating the dimensions of any good rod of the type you intend to make. If a friend or club-mate has a rod you like, you can use that as a model, or even a stranger at the waterside will probably have no objections to you running the tape-measure and callipers over his rod, providing that you approach him at an opportune moment during a lull in sport. The lengths and diameters of the component sections are all that you need. In the matter of rings and bindings, handle-design and fittings, you may possibly be able to improve upon your model, for many commercially made rods are built to a price.

However, before you start copying elaborate rods let us see what we can do by way of a little preliminary practice. In rod-making, as in any other undertaking, it is best to learn to walk before you try to run!

1

An inexpensive rod for a boy

FOR your first attempt I suggest that you do as I did and try your hand at making a boy's float-fishing rod. Such a rod is not difficult to make, costs next to nothing, and will afford excellent practice in rod-making procedure. Even if you have no boy of your own you are bound to know some youngster who will be only too pleased to take the finished article off your hands, and who will not be too critical if your first effort does not turn out to be quite as elegant as you would like it to be. If you follow these instructions carefully, however, it should at least be vastly superior to many of the converted tank-aerials and undisguised pea-sticks which are so often sold commercially as boys' rods.

The little rod described here is largely a 'tip-actioned' rod. In other words, almost all its flexibility or 'action' is in the tip. This makes for a fast-striking rod very suitable for light float-fishing at fairly close range—the sort of fishing usually favoured by the young beginner. Nine feet is quite long enough for the average youngster to handle comfortably, and a rod of this length need not be made in more than two pieces: a whole-cane bottom-piece with a cork handle and a whole-cane top-piece with a spliced-in flexible tip. (Fig. 1.).

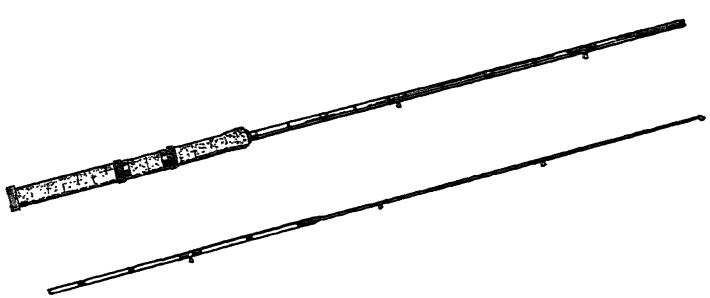


FIG. 1. A boy's float-fishing rod

Choosing the canes

For a boy's rod such as this ordinary garden-canes or 'pea-sticks' serve quite well. You can spend a little more if you like and buy selected *Tonkin* rod-canes, but it will probably mean sending away for them and there is really not much advantage save perhaps a little less preparation. You will need two canes; one 56 inches long with a diameter of about $\frac{5}{8}$ inch at the butt-end, and one 20 inches long with a butt-end diameter a full $\frac{3}{8}$ inch.

Before you go along to select your cane it will perhaps be as well to acquire the first couple of items of your rod-maker's tool-kit, if

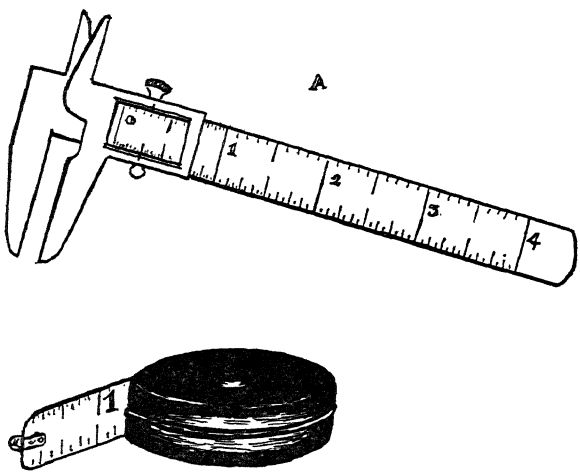


FIG. 2. The rod-maker's measuring tools

you have not already got them. You will need a tape-measure for measuring lengths and callipers of some kind for measuring diameters. A 6-foot steel tape you can get at Woolworth's for a couple of shillings. The handiest type of calliper is that shown in Fig. 2(A), which measures both outside and inside diameters without the need for a separate rule. This must not be confused with the expensive vernier-calliper as used by engineers, the tool shown being a much simpler and cheaper affair. I have one which cost me only sixpence at Woolworth's some twenty-five years ago, but if you have to pay ten times that price now it will be money well spent, for it is a handy little tool to carry in the pocket for measuring rod diameters and selecting canes, ferrules and fittings.

Having got your measuring equipment go along to your local supplier of gardening requisites and rummage among his bundles of assorted canes until you find the sizes you need. If you know what to look for there are some useful rod-canes to be found among the garden-shop's assortment of pea-sticks and you should be able to get a couple of suitable canes for no more than a few pence.

In most canes there is usually a slight narrowing of the diameter

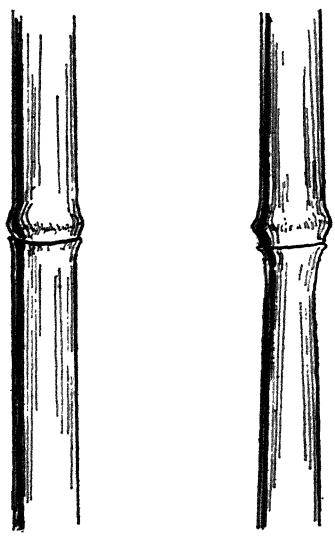


FIG. 3. Good and bad rod-canes
(A) Good rod-cane
(B) Not so good:
diameter irregular below knuckles

just below each knuckle—more so in some than others. Choose canes in which these depressions are least pronounced, preferably of an even straw-colour, and make sure they are free from splits and worm-holes. There is no need to worry about them being bent and knobbly, as such irregularities are soon corrected.

Straightening the canes

To the inexperienced beginner the bent and knobbly appearance of garden canes is rather discouraging. However, an hour's patient

work will change them out of all recognition and make them more like the sleek canes of commercially made rods. Fortunately one of the properties of cane is that it becomes malleable when hot, yet reverts to its former hardness upon cooling. All you need to get your canes perfectly straight is some source of heat, a pencil, a wet cloth and a little patience. The household gas-stove will do to heat the canes over if it is conveniently situated, but this appliance usually stands in some inconvenient corner where there is no room to manœuvre the canes. A portable gas or electric boiling-ring is usually handier.

If you squint along your canes towards the light with one eye closed you will be able to see exactly where the bends are. Deal with one bend at a time. Make a pencil-mark on the inside of the bend, as near to the centre of the curve as you can judge. Rotate the pencil-marked region over the source of heat until it is just beginning to show signs of scorching, then lay it over the edge of the table, pencil-marked side uppermost, and gently counter-bend it. Glance along the cane again to see if the bend has been corrected and re-heat it if further counter-bending is necessary, for if the cane is not hot enough it will just revert to its original shape as soon as the pressure is relieved. When you have straightened one bend swab the treated area with a wet cloth to cool it and then proceed with the next, and so on, until the cane is reasonably straight throughout its length.

Dressing and cleaning up

Now to get rid of those unsightly knuckles. Lay each cane in turn on a flat surface and set about the knuckles with a flat file, rotating them gradually as you are filing. If you possess a sharp plane you can skim off most of the knuckles with that and save yourself a lot of filing. Do not be half-hearted about it. Plane or file away until the protrusions have been reduced flush with the general surface, for there is little danger of unduly weakening the canes as the wall-thickness of garden-canes is usually thicker than need be for rod-making purposes, especially in the region of the knuckles. When the knuckles have been entirely removed slight depressions may still remain which cannot be eliminated without reducing the diameter of the cane along its entire length, but do not be concerned about these as they can be effectively camouflaged later by judicious placing of the silk bindings.

At this stage check for straightness again, for now that the 'bumps' have been removed you may be able to detect slight kinks which were not apparent before. If so, straighten them, however

slight. It is essential that each piece be as straight as you can possibly get it, for the slightest bend will be greatly exaggerated when the rod is subsequently assembled. You can make a final check for straightness by rolling the canes on a perfectly flat table-top, when the slightest curve will be at once apparent.

By now your pea-sticks should be looking a little more like parts of a fishing-rod. All that detracts from their appearance now is the surface finish—the glazed skin of the cane marred here and there by file-marked patches where the knuckles have been removed. Do not rely upon varnish to improve this somewhat unsightly appearance, for the gloss will only tend to magnify any surface blemishes. Remove the remainder of the natural glaze by scraping the canes all over with a cabinet-maker's scraper. (A stout-bladed pocket-knife will do if you have not got a proper scraper.) Follow the scraping with a vigorous rub down, first with medium and then with fine-grade glass-paper. Give the canes a final polish with a handful of the cane shavings produced during the scraping operation and the result should be a satin-smooth finish, the necessary foundation for a first-class varnishing job.

Making the socket-joint

The next step is to make the joint which unites the two halves of the rod, yet allows them to be pulled apart for convenient carriage. Though not really difficult the making of this joint is probably the most tricky part of the whole job and it is best to get it done now before any further work is undertaken. If you should happen to bungle the job at this stage all that is lost is a few pence and a couple of hours' work.

Joint-ferrules we can dispense with, for in a rod such as this they

FIG. 4. Cut-away view showing details of socket-joint

serve only to add to the weight and the cost. If well made, a direct cane-into-cane socket-joint is quite satisfactory. (Fig. 4.) The 'female' half of the joint is made first, by drilling the upper end of the thicker cane to receive the butt-end of the thinner one, but before you attempt to do any drilling there is an important precaution that you must take. Reinforce the end of the cane to be drilled by firmly

binding the last three inches or so with strong cotton thread. This binding is only temporary and need not be particularly neat, but do not be tempted to dispense with it or the cane will almost certainly split during the drilling operation.

This operation is really only a matter of opening out an existing hole to the required size, for there is, of course, already a natural hollow down the centre of the cane. For this reason the usual type of wood-boring bit which rotates around its centre 'pilot' point is useless. What you need is a $\frac{3}{8}$-inch diameter metal-worker's twist-drill, one with a square shank if you can get one, so that you can use it in an ordinary carpenter's brace. These square-shanked drills are not very

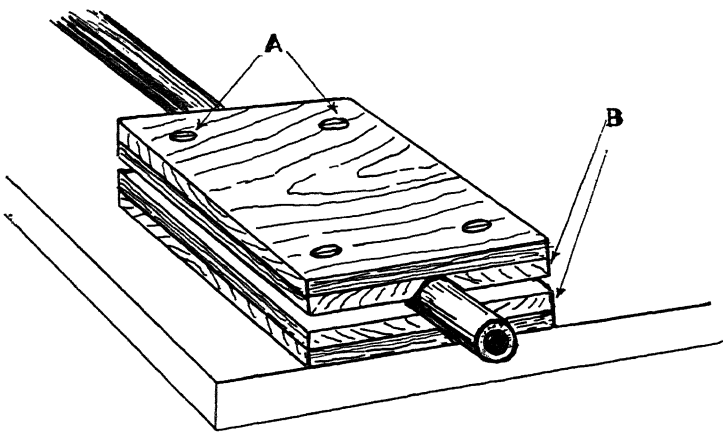


FIG. 5. Improvised clamp for holding canes for drilling
(A) Wood-screws right through into bench. (B) Chamfered strips glued on to form vee-grooves

common, however, and if all you can get is the usual round-shanked drill you will have to use it in a metal-worker's hand-drill. Or perhaps you may be able to persuade some fitter or mechanic to square the drill-shank for you on the grinding-wheel. The carpenter's brace is definitely handier for the job than the geared hand-drill.

The cane must be firmly held whilst you drill it. What you really need is a vice, but if you do not possess one it is not a big job to make the simple clamp shown in Fig. 5. Making this may seem to be going to a lot of trouble just to drill a hole, but it is important that the drill be kept in perfect alignment and you cannot hope to do this if the cane is twisting and swivelling. Even if you have a vice it is advisable

to make a pair of slip-on vee-jaws like those shown in Fig. 6. These will reduce the risk of splitting the cane by gripping it too tightly.

Making all the various bits and pieces of equipment which I shall describe from time to time may seem rather a 'bind' when you want to be pushing on with the job, but you cannot do anything properly without the tackle for the job. These various gadgets will always be useful for other rods you may make.

There is nothing to the actual drilling once the cane is firmly held. All you have to watch is that the drill is kept in line with the cane. It is a big help if you can get someone to crouch down with the drill at eye-level, to advise you 'up a bit' or 'down a bit' if the drill should tend to wander from the horizontal. Lateral alignment you can look

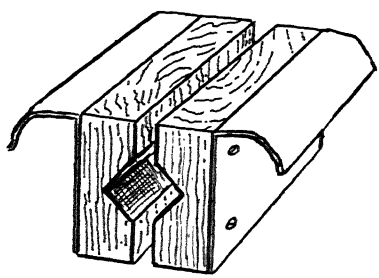


FIG. 6. Slip-on vee-jaws for vice

after yourself. Do not force the drill and withdraw it frequently to clear the shavings. Drill to a depth of rather more than 3 inches.

The last 3 inches at the butt-end of your thinner cane has now got to be reduced until it fits snugly into the hole you have just made, but before you do any reducing this 'male' portion must be strengthened by plugging the natural hollow centre. To do this open up the natural hollow with a $\frac{1}{4}$-inch drill to a depth of about $3\frac{1}{2}$ inches. (Not forgetting to put on a temporary binding again to prevent splitting.) Now sand-paper a $3\frac{1}{2}$-inch length of $\frac{1}{4}$-inch dowel until it is a nice push fit in the hole. Do not make it so tight that it has to be knocked in, or you may burst the cane despite the cotton binding. Round off the upper end of your plug with a file, as in Fig. 4 (*see* page 19), give it a coat of glue, then push it home and leave it for a while to set.

The end you have just plugged should not need much rendering down to make it fit the hole in your bottom-piece. Reduce it with a file and sand-paper, checking frequently with your callipers to make

sure you are keeping it perfectly round and free from taper. Better still, make the simple filing-jig shown in Fig. 7. This is just a couple of strips of wood spaced $\frac{3}{8}$ inch apart. (Use your $\frac{3}{8}$-inch drill as a spacer when nailing on the strips.) You just lay the butt-end of your cane over the groove so formed and file away, rotating the cane as you are filing, until it drops neatly into the groove at all points of its circumference. Finish off by rubbing it down with sand-paper until it pushes home into the female half without any trace of looseness or shake.

Socket the two canes together and glance along them to see if the assembly is perfectly straight. If it is you can pat yourself on the back, for you have made a good job of the drilling. If not you have no need to scrap the job and start again. Just heat the appropriate

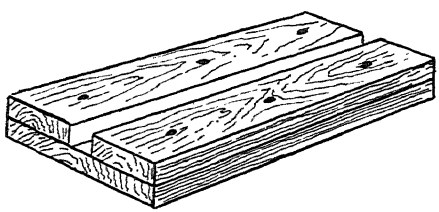


FIG. 7. Simple filing-jig for forming male half of socket-joint

place over the gas-jet and gently pull the top-piece into line. If you do this, however, you must make a pencil mark on each cane so that you can line them up in the same position again when you come to whip on the rings. If the top-piece is pushed in the other way round there will be a bend worse than the one you had in the first place!

Splicing in the tip

You have now only to splice in the flexible tip and the basic rod is complete. Tips are usually made from split-cane, greenheart or fibre-glass, though I do not advise split-cane for a boy's rod. Unless you make it yourself split-cane is an expensive material and small boys seem to be able to break top-pieces with remarkable facility. A tip for a boy's rod is best made from fibre-glass, which he is unlikely to break, or from greenheart which can be replaced at small cost in the event of any calamity. Fibre-glass is quite reasonably priced nowadays, but the trouble is that it is not workable by amateur methods and it can be used only if a standard piece with the required

dimensions is obtainable. For the rod in question I would suggest greenheart.

You will need a tip 36 inches long, tapering from $\frac{3}{16}$ inch to $\frac{3}{32}$ inch. In a later chapter I will show you how to fashion a greenheart top from the rough square timber, but for your first effort perhaps your best plan is to buy one ready rounded and tapered. As you get it from the tackle-shop it will probably be rather thicker than you need, but it is not a difficult job to scrape and sand-paper it down to the required dimensions. All you have to watch is that you preserve an even taper.

Now take your short piece of cane and bind the upper end as you did before, but this time first file a chamfer at the end as in Fig.

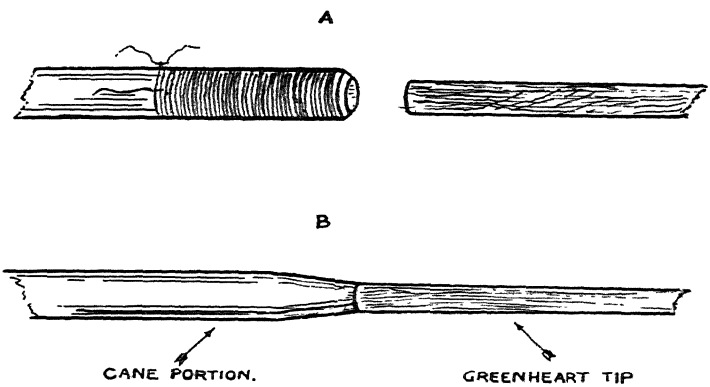


FIG. 8. Splicing in the tip

8(A). Drill it with a $\frac{3}{16}$ inch drill to a depth of 2 inches and then sand-paper the butt-end of the greenheart tip until it will push in snugly. Check it for alignment, just as you did with the two canes, then glue it in and leave it for an hour or two.

When the glue has set strip off the temporary binding and with your file taper off the cane gradually down to the greenheart as in Fig. 8(B), then smooth off the junction with sand-paper. A permanent binding is needed over the splice, but this can be left until the remainder of the whipping is done. A temporary wrapping of 'Sello-tape' will protect it in the meantime.

This completes the basic rod. All it needs now is the addition of the cork handle and line-rings. The handle should be 18 inches long and is built up from bored corks, a process I shall deal with in a later chapter. Whipping and varnishing, too, are to be the subjects of

separate chapters, the only point I need touch upon here being the choice of line-rings for this particular rod. Rod-rings of the 'stand-off' type (Chap. 10, Fig. 44A) are the best for a rod intended for light float-fishing but they do not stand up well to the rough usage that a boy's rod usually gets. A better choice for this rod would be the 'double upright' (Chap. 10, Fig. 44C). These are cheap and are practically unbreakable.

I may seem to have used a lot of space to describe the making of a simple rod for a boy, but I have done so intentionally, for various processes are involved which will crop up in other more elaborate rods you may make. This little preliminary practice will prove invaluable when you come to carry out the same processes in more expensive materials.

2

Match-rods

IF YOU have successfully made the little rod described in the previous chapter you can undertake with confidence the making of that very popular type of rod known as the 'match' rod. A little more work is involved, but the procedure is very much the same, for the so-called match-rod is really nothing more than a larger version of the boy's rod we have just made.

It is longer, of course, and it is usually made in three pieces instead of two, but the only important difference is in the basic material. Being longer, the match-rod has to be made proportionately thicker in its lower parts if the flexibility or 'action' is to be confined to the tip—a quick-striking tip-action being the characteristic feature of these match-type rods. This means that some lighter cane must be used if the rod is not to be uncomfortably heavy and unwieldy. Thick-walled Tonkin cane like the garden-canes we used for the boy's rod is much too heavy in the larger match-rod diameters.

At least, it is in its natural state. It *can* be lightened considerably by boring out the centre to reduce the wall-thickness, but this boring process is a ticklish job for which special tools are needed, and it is hardly a worth-while proposition for the angler who intends to make just one or two rods for himself. I would recommend it, though, to anyone who intends to make a regular hobby of rod-making and is prepared to have the necessary equipment made. Tonkin cane is about the cheapest of the rod-making canes, yet when it is suitably lightened it cannot be bettered for the lower sections of match-type rods. For the benefit of those who are inclined to have a go at it I will devote a chapter later to this very useful boring technique.

However, if you have neither the means nor the inclination to bore out Tonkin canes you will just have to use a variety of cane which is naturally lighter; either *Japanese Cane* or *Spanish Reed*. Let us consider first the construction of a rod from Japanese Cane, or 'Jap', as it is more usually called.

Jap Cane construction

Japanese Cane is very much like Tonkin in texture, but it is much thinner in the wall and appreciably lighter, though not nearly so light as Spanish Reed. The nodes or 'knuckles' are not too pronounced and are fairly widely spaced, so that not too much work is entailed in dressing and cleaning up. It also has the advantage of a greater degree of natural taper than either Tonkin or Spanish Reed, a feature which simplifies rod-construction considerably. It is an excellent material for rods up to about 12 feet long, but above that length its weight begins to make itself felt, and in the absence of bored Tonkin you will just have to use Spanish Reed for the longer rods and put up with its disadvantages, of which I will have more to say later.

Buying and preparing the canes

Jap canes are often sold in 'sets'; a set consisting of a selection of sawn-off lengths of cane of graded diameters suitable for making a rod. The trouble with buying these, however, is that they may not be suitable for the particular rod *you* intend to make. It is much better (and cheaper) to buy a complete Jap cane and cut from it the lengths you require. As there is invariably length to spare in a full Jap cane, and considerable taper, you can cut out your pieces from that part of the cane where the diameters are appropriate.

Let us take as a typical example the construction of a 12-foot rod. For this you will need a cane with a butt-end diameter of about $\frac{7}{8}$ inch, which will normally be about 15 feet long, tapering away almost to a point. If you cannot obtain one locally you can always order one, or preferably more, from one or other of the firms which specialize in the supply of rod-making materials. (You will find their advertisements regularly in the angling journals.) I suggest that you order more than one because the cost of carriage is likely to be just as much on one as on three or four and you need not worry about having the extra canes left on your hands. Once you have got the hang of this rod-making business you will soon put your surplus canes to good use.

Your 15-foot cane will not be delivered, of course, in one piece. The supplier will cut it up for delivery, but to your instructions. Ask for it to be cut into three 5-foot lengths. This is a convenient length for transit and as it is rather longer than you really need it will give you a certain latitude in the matter of diameter when you cut out your finished lengths.

Your butt-length needs to be 51 inches long, tapering from

$\frac{7}{8}$ inch diameter to $\frac{3}{4}$ inch. The middle length should be 50 inches long and should taper from $\frac{5}{8}$ inch to $\frac{1}{2}$ inch. You should be able to get two such pieces from the lower two-thirds of the average 15 feet Jap cane. Cut them to length with any kind of fine-toothed saw and save the bits you cut off. We will find a use for these later when we get to the varnishing stage.

The remaining third of your Jap cane you can throw away. In most Jap canes the last few feet at the tip are so irregular as to be of little use for rod-making purposes. The top-piece of the rod is made from a 36-inch flexible tip spliced into a short length of whole cane. This whole-cane portion should be 15 inches long, tapering from $\frac{3}{8}$ inch to $\frac{5}{16}$ inch and can be cut from a piece of ordinary garden-cane.

The procedure for straightening and dressing the canes is exactly the same as for the boy's rod described in the previous chapter. Though Jap cane is thinner in the wall it is quite robust and will stand considerable straightening and dressing.

Making the socket-joints

In a match-rod joint-ferrules are unnecessary; in fact, they are undesirable, as weight must be kept to a minimum. All the action is in the tip and there is no great strain on the joints, so cane-to-cane joints like the one we used in the boy's rod are quite satisfactory. I need not describe the making of them in detail, for the procedure has already been described in the previous chapter. The female ends are drilled out and the male ends are plugged with dowel and filed and sand-papered down to fit.

The upper end of the butt-length is drilled $\frac{5}{8}$ inch to a depth of 3 inches to take the bottom end of the middle-piece. The upper end of the middle-piece is drilled $\frac{3}{8}$ inch to take the whole-cane portion of the top. Lastly the upper end of the whole-cane portion of the top is drilled $\frac{7}{32}$ inch to take the butt-end of the 36-inch flexible tip, which can be of split-cane or greenheart and should taper from $\frac{7}{32}$ inch to $\frac{3}{32}$ inch. The tip is, of course, spliced permanently into the whole-cane portion, as described in the previous chapter.

The tip can be bought ready-made, or if you feel like tackling the job you can make it yourself. I will give instructions for making both split-cane and greenheart tips in subsequent chapters.

Spanish Reed construction

Spanish Reed is the lightest of all the rod-making canes, but in my opinion lightness is its only good point. It is a very fragile material,

difficult to work, and its surface is often marred by dark stains which are, to my way of thinking, unsightly in the finished rod. I have made several good Spanish Reed rods, but frankly it is a material I do not like to work with. Reed rods are wonderfully light but *good* ones are not easy to make. Spanish Reed construction is one field, I think, where the commercial manufacturer has the advantage over the amateur. The professional has a much wider choice of reeds, and in the making of reed rods the choice of material is probably the most important factor.

The trouble is that Spanish Reed is so thin-walled and fragile. You cannot fashion it with the same facility as the other canes, for it splits or collapses at the slightest provocation. It *can* be straightened like the other canes, by warming and counter-bending, but this must be done with the utmost caution or the cane will collapse. Dressing and cleaning up must also be kept to a minimum. Almost all the strength of Spanish Reed is in the outer skin and this must be left, as far as is possible, intact. In the making of joints and splices a *very slight* reduction in the outside diameter is permissible, but this must be done only where the reed is buttressed by plugging the hollow centre.

The secret of making good reed rods is to choose the canes carefully with regard to diameters, so that the minimum of work is necessary to make them fit snugly one inside the other. Unfortunately few amateurs are in the happy position where they can go along and select their reeds from a large stock, most of the selections offered in tackle-shops being hopelessly inadequate. The pick of the tackle-shop's stock is soon snapped up and after that it is more a question of making do, rather than selecting.

If you intend to make a reed rod your best bet is to order your reeds from one of the leading suppliers of rod-materials—preferably one who is a rod-maker himself. Give the approximate lengths and diameters you need and order selected, straightened reeds. These will probably cost you at least twice the price of a makeshift selection from the tackle-shop, but the resulting rod will be much more satisfactory.

There is very little natural taper in Spanish Reed. The necessary taper-off to the tip is achieved by 'step down' splicing; that is, by splicing canes one inside the other. Four steps are usually necessary to get down from butt-diameter to tip size. The socket-joints form two of them and the splicing of the tip into the whole-cane portion of the top provides another. The fourth step is made by a splice at a point in the middle length.

A 15-foot Spanish Reed rod

As an example of Spanish Reed construction let us consider the making of a 15-foot rod. If you wish to make a longer or shorter rod you will have to get your dimensions from an existing rod or modify the dimensions given here proportionately.

The butt-length is a single piece of reed 62 inches long with an outside diameter of about $\frac{15}{16}$ inch at its upper end.

The middle-length is made from two pieces of Spanish Reed spliced one inside the other. The lower piece is 49 inches long tapering from $\frac{13}{16}$ inch to $\frac{3}{4}$ inch. The upper piece is 14 inches long with a diameter of $\frac{5}{8}$ inch. (There will be hardly any taper in such a short length.) The bottom 2 inches of the short piece is plugged with dowel and is glued permanently into the upper end of the longer piece, the

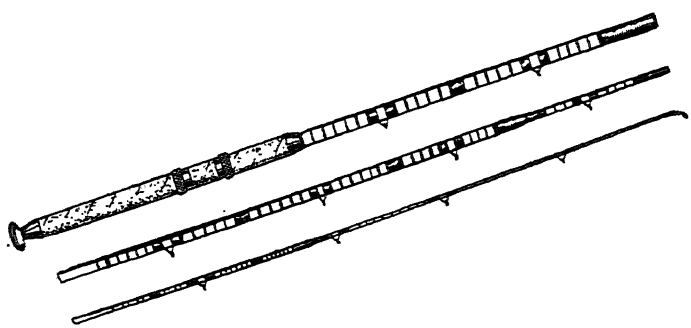


FIG. 9. A Spanish reed match-rod

step being tapered off with file and sand-paper and subsequently reinforced with a whipping. The bottom end of the completed middle-piece is then plugged and reduced for a length of 3 inches to socket into the upper end of the butt-length.

The top length is made up of a 42-inch split-cane or greenheart tip tapering from $\frac{1}{4}$ inch to $\frac{3}{32}$ inch spliced into a 22½-inch length of cane tapering from $\frac{1}{2}$ inch to $\frac{3}{8}$ inch. Two inches of the tip is spliced into the cane and 2½ inches of the cane sockets into the upper end of the middle-piece.

When making joints and splices in Spanish Reed it is *especially important* to bind the ends firmly with stout thread before attempting to insert any strengthening dowels. Diameters should be carefully chosen so that little more than a cleaning up of the natural hollow centre is necessary to form the female halves of joints. This cleaning up can be done quite effectively by wrapping coarse glass-paper around

a length of dowel and using it in a carpenter's brace. The glass-paper is secured by putting one edge in a slot in the dowel as shown in Fig. 10. Some rod-makers get around the problem of making joints in Spanish Reed by using joint-ferrules, but this procedure cancels out the one advantage possessed by Spanish Reed—lightness.

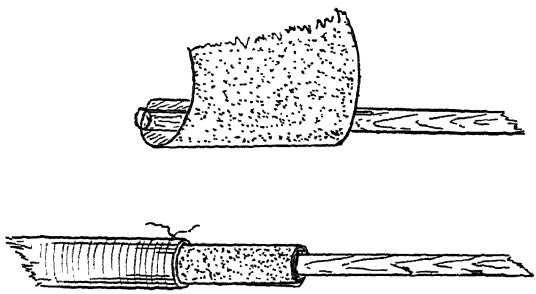


FIG. 10. Cleaning up cane's hollow centre with sand-paper wrapped around dowel

Bored Tonkin construction

Match-rod construction with bored Tonkin cane is exactly the same as with Spanish Reed, but even when it is bored out to leave quite a thin wall Tonkin is a much tougher material than Spanish Reed and not so hazardous to work with. With Tonkin the only tricky job is the boring. Once this is done the rest is usually plain sailing. Bored Tonkin is a much more satisfactory material in every way, and if you intend to make enough rods to justify having the tools made the boring process is well worth tackling. In the next chapter I will describe the necessary tools and explain how it is done.

3

Boring Tonkin Canes

IT IS only fair to warn you before you start that unless you have some obliging friend in the engineering business the tools for boring Tonkin canes will probably cost you a few pounds. Still, if you intend to make a paying hobby of rod-making and are likely to be making match-rods from time to time it may be well worth your while. Bored Tonkins make a much more serviceable rod than Spanish Reeds and they are only about one third the price. The profits from the sale of a couple of your bored Tonkin match-rods will probably defray the cost of your boring equipment.

The boring tools

Most of the strength of Tonkin cane is in the hard outer skin, and if you remove the bulk of the pithy wood from the centre you will still have sufficient strength for the lower sections of match-rods. This hollowing out is done gradually, by boring the canes right through with a series of drills of increasing diameters until the wall-thickness is only about $\frac{1}{16}$ inch or thereabouts.

I say that the canes are bored right through, but this is not strictly correct. In actual practice they are drilled half-way through from one end, then from the other end to meet. This means that you need drills some 30 inches long to bore out a cane for a 5-foot butt-joint.

It is no use trying to buy such drills at the tool-shop, for the need to drill 30 inches deep does not arise often enough to make their sale a business proposition. What you have to do is to get some extension-shanks made and have standard drills adapted to fit them. These extensions are just lengths of the round steel known as 'bright bar', with a square at one end to fit a carpenter's brace and a hole at the other end to take the reduced shanks of the twist-drills. Making them is quite a simple job for anyone with a lathe at their disposal, and in the absence of any obliging engineer friend you should be able to get them made at reasonable cost at some small jobbing machine-shop, or perhaps even at your local garage.

At a pinch you will be able to manage with two of these extensions, but if you are in a position to get more made it will save you having to keep changing the drills. For boring out canes for butt-joints, which may be up to 5 feet in length, you will need one 30 inches long. One 24 inches long will do for middle-joints, as these are not usually made from single canes. The longer extension should be $\frac{3}{8}$ inch in diameter and should be drilled $\frac{1}{4}$ inch to a depth of

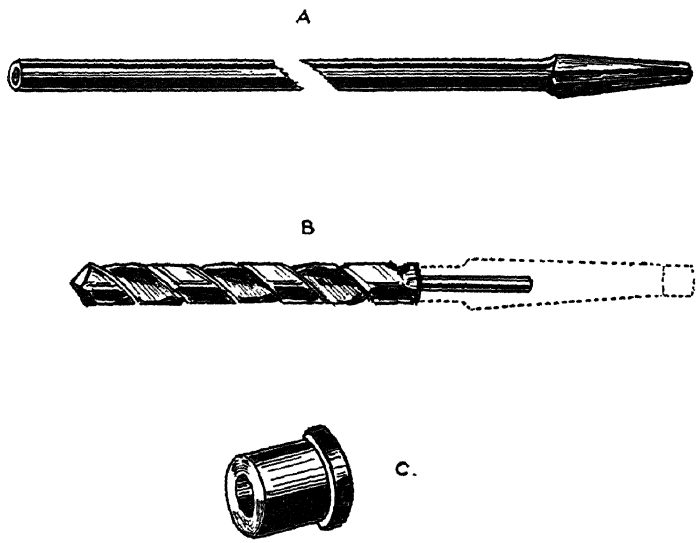


FIG. 11. Tools for boring out Tonkin canes
(A) Extension-shank for boring canes. (B) Drill reduced to fit in 'extension' (dotted lines show original shape of shank). (C) The pilot-bush (optional)

2 inches. The shorter one should be $\frac{5}{16}$ inch diameter with a $\frac{3}{16}$-inch hole $1\frac{1}{2}$ inches deep. (*See* Fig. 11A.)

The whole-cane portions of top-pieces are not usually bored, as there is little to be gained with canes of such small diameter. For the general run of canes that you will be boring for butt and middle-joints you will need at least eight drills, ranging from $\frac{5}{16}$ inch diameter to $\frac{3}{4}$ inch in $\frac{1}{16}$-inch stages. The more drills you have and the more gradually they increase in diameter, the easier the job will be, as you will have less material to take out at each boring. However, if you go carefully the job is quite practical with the range of drills I have mentioned.

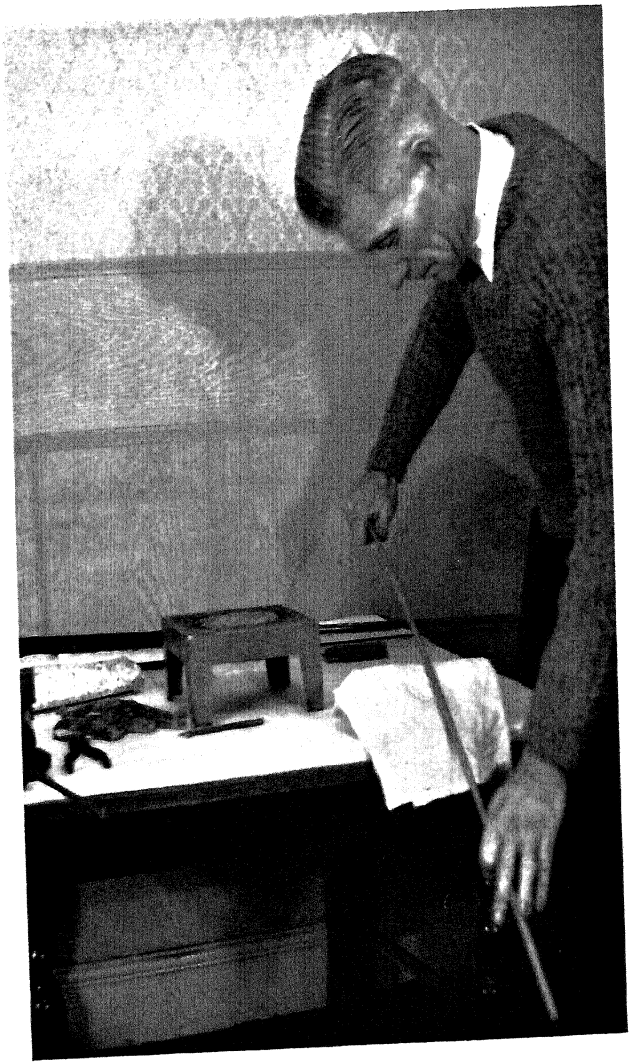


PLATE I

Straightening a cane

PLATE 2

Scraping a cane

The shanks of these drills will, of course, have to be reduced to fit into the extensions, a job which you will have to get done by whoever makes the extensions for you. The $\frac{5}{16}$-inch and $\frac{3}{8}$-inch drills should have their shanks ground or turned down to form spigots which will fit, not too tightly, into the hole in the short extension. Those above $\frac{3}{8}$ inch should be machined in a similar manner to fit the longer bar. The best kind of drills to get are taper-shanked machine-drills, as the shanks of these are comparatively soft and can be machined down to the required size of spigot quite easily, whereas parallel shanks are often so hard that grinding is the only way of reducing them. Most engineering firms scrap twist-drills when they become excessively shortened by frequent re-grinding, and if you have any contacts in the engineering business you may be able to obtain a selection of these discarded drills for next to nothing. Though their useful life is over with regard to drilling metal they are still quite satisfactory for boring bamboo canes.

Soldering in the drills

The drills are soldered into the appropriate extensions as required, an operation that is not half as difficult as you may imagine. After a little practice you will be able to extract one drill and substitute another in a matter of minutes. This is how you do it.

First, scrape the drill-spigot and the interior of the hole until they are really *clean and bright*. Next, douse the interior of the hole with soldering-fluid (Spirits of Salts or 'Bakers' Fluid) and melt a blob of solder into it. Hold the end of the extension over the gas-jet to keep the solder in the hole in a molten state, then dip the spigot of the drill in the soldering-fluid and push it into the hole. When it cools off the drill will be firmly attached.

To change drills you just warm the soldered joint over the gas-jet until the solder melts, then out comes one drill and in goes another. There is nothing to it. Once the drills and the inside of the holes have acquired a coating of solder, or 'tinning', repeated scraping is not necessary. A dousing with soldering-fluid is all that is needed.

Preparing the canes

Canes for boring should be those known in the trade as 'prime' Tonkins. These are usually fairly straight and round, with the minimum of irregularity at the knuckles. It is worth spending a shilling or two extra to get really good canes, and it is wise to order one or two more than you actually need, for even experienced rod-makers

sometimes scrap a cane in the boring process. Fortunately Tonkins are not expensive.

The first step is to straighten your canes, for no natural cane is ever *really* straight, and straight they must be if you are to bore them. With the best equipment in the world you cannot bore a straight hole through a bent cane! Straighten them in the usual way by warming and counter-bending and check them by rolling them on a perfectly flat table-top to ensure that there is not the slightest camber in the whole length.

Next clean up the canes by skimming off the knuckles and

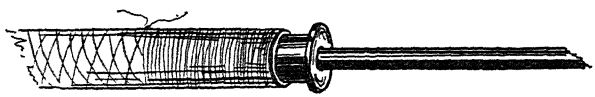


FIG. 12. How pilot-bush is used to keep boring-bar in alignment

scraping and sand-papering them all over. This can be done most conveniently while the cane is in its solid state with a substantial wall-thickness. Before you attempt to bore a cane it must be firmly bound along its entire length to prevent splitting. For this binding you will need a ball of strong fine twine. The cane should be closely bound for three or four inches at each end, where splits are most likely to occur, and as an added precaution the binding should be taken in open turns along the length of the cane and back again as in Fig. 12.

The boring process

In the boring process considerable twisting force is exerted, so it is essential that the cane be firmly held, preferably at both ends so that there is no tendency for the cane to 'whip'. You are not likely to possess *two* vices so you will have to make a couple of improvised clamps like that shown in Fig. 5 (Chapter 1). It is most important, of course, that these are fixed to the bench or table-top in perfect alignment or they will impart a bend to the cane.

Bore through first with the drill nearest in size to the natural hollow of the cane, going as far as you can from one end, then reversing the cane and drilling to meet from the other. This first run through will remove very little from the wall-thickness, but it will get you through the solid 'bulkheads' at the knuckles and will give you a continuous hole right through. This will be a big help during subsequent drilling, as it will enable you to blow the shavings right

through when you withdraw the drill to clear it. A pair of bellows are handy for blowing out the chips, but if you have none a good bicycle-pump makes a useful substitute.

Once you have got a hole right through your cane you follow through with the other drills in turn until you achieve the desired wall-thickness, which is usually about $\frac{1}{16}$ inch.

When drilling turn the brace steadily and do not try to force the drill. Keep the drills really sharp and withdraw them frequently to clear the chips, as it is the packing of the chips in the flutes of the drill which makes the job 'hard going'.

It is a big advantage if you can get someone to crouch down and 'sight' for you and advise you if the extension-bar is wandering from the horizontal. A pilot-bush, too, is a big help if you can get some turned to suit the various drills. Fig. 12 (*see* page 34) shows how a pilot-bush is used to keep the boring-bar aligned with the cane.

When you have successfully bored out your cane to the required wall-thickness, test it for any potentially weak spots. You can do this by stopping up one end of the bore and looking down the other end, with the cane held up towards a strong light. If the light penetrates in any particular place it is a sign that the wall has 'run thin' at that point and the cane may possibly be weakened.

An alternative method

There is, I believe, an alternative method of hollowing out Tonkins; one which does not necessitate the use of boring equipment. I have never tried the technique, nor have I seen it done, so I can include it only as a suggestion for experiment.

With this method the cane is split down the centre from end to end and the two halves are then hollowed out with gouges to the required thickness. The split edges are left at their original thickness

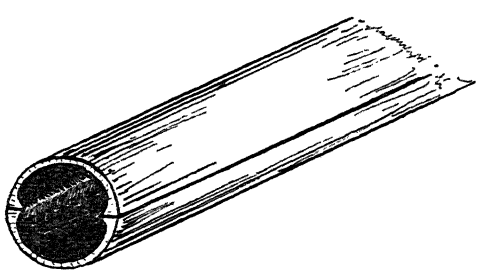


FIG. 13. Cane glued together again after being split down and hollowed with gouges

(Fig. 13) to enable the two halves to be glued together again after some of the weight has been taken out.

I see no reason why this method should not be a practical proposition. It seems a drastic step, I know, to split the cane deliberately from end to end, but modern adhesives make joints as strong, if not stronger, than the original material. After all, split-cane is glued together and that usually takes a 'beating' far greater than the rigid parts of match-rods are ever called upon to take.

4

Ferruled Rods

THE majority of fishing-rods are ferruled rods. Ferrule-less joints are dependable enough for light rods of the 'match' type, where the tip does most of the work and there is no great strain on the lower parts of the rod, but something more substantial is needed in rods intended for heavier work, and also in the more pliant rods where the joints are subject to bending stresses. This means using joint-ferrules, undesirable though they are.

Ferrules are a necessary evil. They affect the action of a rod and add considerably to its weight, but as one-piece rods are rarely a practical proposition we just have to use ferrules and put up with their disadvantages. A golden rule in all rod-making is never to incorporate more ferruled joints than are absolutely necessary for

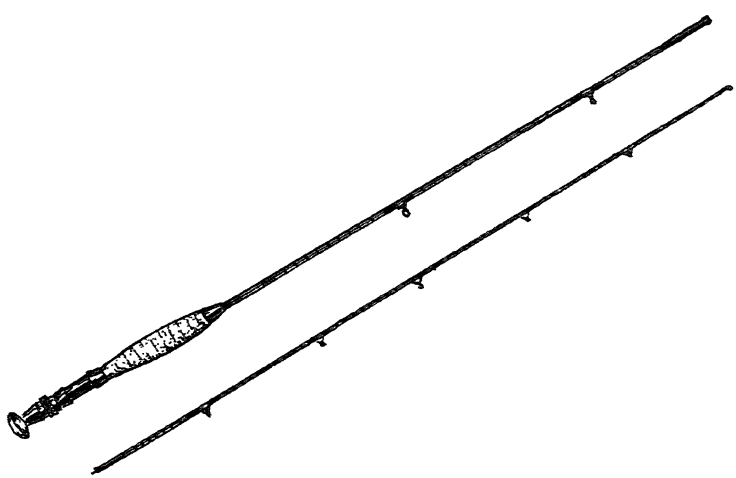


FIG. 14. A typical ferruled rod

convenient carriage. For instance, a 10-foot rod which breaks down into three pieces is delightfully compact and handy to carry about, but from the point of view of performance it cannot compare with a similar rod made in *two* pieces.

Ferruled joints do, however, have one great advantage, in that they simplify rod construction considerably. Making a ferruled rod is an easy task compared with the making of a match-rod with cane-to-cane joints; in fact, many amateur rod-makers (and manufacturers!) take the easy way out and use ferrules in match-rods. They put up with the extra weight to save the work entailed in making ferrule-less joints.

Dimensions

I am not going to attempt to give here the detailed dimensions of each and every variation of the many types of ferruled rods—float-rods, fly-rods, spinning-rods, sea-rods—and so on. There are far too many of them, and in any case anglers are not always entirely in agreement as to the most suitable dimensions for a particular type of rod. What suits one angler may not suit another. Ferruled rods are all made in more or less the same way, and my advice is for you to get your dimensions from any good rod of the type you wish to make. The advantage of copying an existing rod is that you know before you start whether the rod you are going to make is the particular rod you want. For the beginner, at least, it is almost impossible to visualize the finished rod from a list of dimensions on paper.

However, for the benefit of novice anglers who may be somewhat bewildered by the wide variety of fishing-rods and who are shy about seeking advice I will include in the form of an appendix the dimensional data for a representative selection of the main types.

The basic 'sticks'

The first step in the making of any ferruled rod is to procure the basic 'sticks' or blanks. These you can buy ready-made as a set, or if you feel like tackling the job you can fashion your own from the raw material. The advantage in making your own, apart from the financial saving, is that you can make them exactly as you want them. With ready-made blanks you just have to make do with the nearest standard pieces available.

Natural canes

The straightening and dressing of the various natural whole-canes

has already been dealt with in previous chapters, and all I need mention here is an alternative variety of cane which is much used for certain types of sea-rods. This is East Indian or Burmese brown bamboo, which can be bought in the form of complete canes, usually 16 feet to 18 feet long and tapering from about $1\frac{1}{4}$ inches diameter to almost a point. If you send away for these canes they will have to be cut up, of course, for convenient transit, so cutting instructions should be sent with the order.

Greenheart

This can be bought as rough, square-section timber, or in the form of finished lengths ready rounded and tapered. The prepared lengths save a lot of work, but they cost about three or four times the price of the rough timber, and it is not always possible to obtain the exact sizes and tapers you need. They can be modified, of course, by scraping and sand-papering, but if much work is involved you may just as well fashion the pieces yourself from the rough square and save yourself some money. I will give instructions for shaping greenheart sections from the rough in a later chapter.

Split-cane

The same applies to split-cane sections. You can either buy a set of finished blanks or make up your own from the raw bamboo—a process which is not really *too* difficult and which I shall deal with in later chapters. It is perhaps best for the beginner to use commercially made split-cane for his first few rods, or for one rod at least. This will give him some idea of the standard he must set himself when he tackles the job of making his own.

Other basic materials

The only other basic rod-materials in general use nowadays are fibre-glass and steel. There is some scope for the amateur now in fibre-glass construction, and in a later chapter I will have something to say about this comparatively recent innovation. Fibre-glass blanks can now be obtained in the form of standard sets for certain types of rods. Almost every tackle-shop seems to stock nowadays complete glass-rod 'kits' comprised of the necessary glass blanks, fittings, corks, glue, varnish and whipping silk.

Steel rods we can forget about. The amateur cannot make steel sections himself, and the only ready-made blanks available were designed originally as tank-aerials and not as fishing-rods and are never very satisfactory.

Types of ferrules

Having procured your blanks you have only to fit them with joint-ferrules and your basic rod is complete, ready for the handle and line-rings.

You buy ferrules, of course, in pairs—male and female. They are obtainable in a wide range of diameters, ranging from $\frac{3}{16}$ inch to as large as $1\frac{1}{8}$ inches, the standard of measurement for ferrules being the *inside* diameter of the female portion (or, if you like, the outside diameter of the male half, which is, of course, the same). There are various patterns to choose from; some fairly cheap, others quite expensive, but always use the best you can afford. Measure the ends

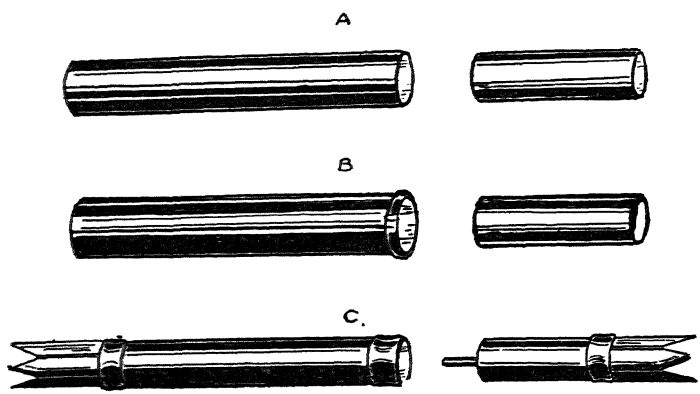


FIG. 15. Types of ferrules
(A) Plain drawn brass. (B) Reinforced. (C) Splint-ended

of your blanks with the callipers and choose the ferrules carefully with regard to size. If the size is right the ends of the blanks should need the minimum of reducing to make the ferrules fit. It is better to get ferrules a fraction too big, rather than too small, for any drastic reduction of the blank will seriously weaken the rod. Do not be fobbed off with the nearest size the local tackle-shop has in stock. If you cannot get the right size send away for them, for ferrules are made in such a wide range of sizes that you should be able to get them within $\frac{1}{32}$ inch of the required diameter.

Plain drawn-brass ferrules (Fig. 15A) are the simplest and cheapest, but these are suitable only for light rods where there is no great strain on the joints. They *will* stand up to heavier work for a while, but after a time the metal becomes 'fatigued' and these thin-drawn ferrules are

liable to split. There is always the danger, too, that the thin ends of these plain ferrules may be accidentally burred over or distorted.

Reinforced ferrules are better. (Fig. 15B.) These can be had in thin gauge brass with a light reinforcing band at the vulnerable point, or in heavy gauge brass with a really stout reinforcing collar. The former are suitable for the general run of rods; the latter for stout rods like sea-rods which have to stand up to the strain of casting heavy weights and playing comparatively big fish.

The splint-end type (Fig. 15C) are the best for flexible rods like fly-rods and spinners. The continual flexing of such rods tends to loosen plain ferrules in time, no matter how well they are fitted, and splint-ended ferrules are well worth the extra cost. In the smaller sizes they can be obtained with *two* male portions for making rods with alternative top-pieces, and if cost is no object you can get them with various 'lock-fast' devices to prevent them from coming apart inadvertently whilst you are fishing. However, as this rather embarassing calamity has happened to me only once in a lifetime of fishing I hardly think this refinement worth the considerable extra cost.

Fitting plain ferrules

Let us consider first the fitting of plain ferrules to whole canes, as it is with this material that this type of ferrule is most often used. The points just above and below ferrules are the potentially weak spots in a rod, so begin by buttressing the ends of the canes where the ferrules are to fit by plugging the hollow centres with lengths of suitable dowel. These dowel plugs should be an inch or so longer than the ferrule seat and the ends which go into the cane should be rounded off as in Fig. 4 (Chapter 1). Do not forget to put a binding on the ends of the canes before pushing in the strengthening dowels or they are likely to split.

Fit the female half of the ferrule first. Make a pencil-mark on the cane to show how far the ferrule is to be pushed on. You determine this by measuring how far the male part goes into the female. Leave this length of the female ferrule projecting from the cane to form a socket for the male half and allow an extra $\frac{1}{16}$ inch for good measure to allow for wear.

The end of the cane must now be reduced until the ferrule is a really tight force-fit. Reduce it with file and sand-paper, and check frequently with the callipers to make sure that you are keeping it perfectly round and free from taper. Fig. 16 shows two common faults in ferrule fitting which you must strive to avoid if you do not

want to be troubled later with ferrules working loose. If the job is well done the entire inner surface of the ferrule should be in contact with the cane.

Continue sand-papering until the ferrule will just push part-way on and you feel that a couple of good wallops with the mallet would drive it right on up to the pencil-mark. Do not use force, however. Pull the ferrule off again and give the end of the cane a liberal coat of 'Durofix'. Before you replace the ferrule heat it slightly to expand it. It will then push on fairly easily, a few light taps being all that will be necessary to push it right up to the pencil-mark. If it is a cheap plain ferrule you can heat it over the gas-jet, but if it is one of the

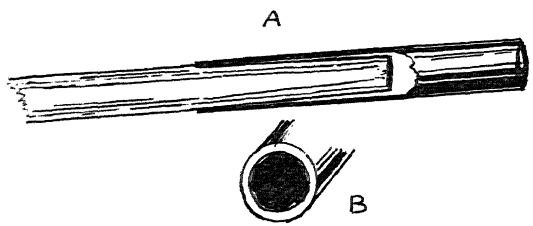


FIG. 16. Faults in ferrule fitting
(A) Ferrule-seat tapered. (B) Ferrule-seat not round

more expensive types you should heat it by dipping it in boiling water for a few moments. In this way you will avoid spoiling the bronze finish.

The male portion is fitted in the same way, the only difference being that the male is, of course, driven right on, flush with the bottom of the cane.

If it has been necessary to choose ferrules slightly over-size to save reducing the cane too much you will have to *increase* the diameter of the cane to make the ferrule a good fit. You do this by binding the cane with silk thread until it is brought up to ferrule-size, a coat of cellulose varnish being put on the whipping before the ferrule is put on.

Splint-ended ferrules

Fitting splint-ended ferrules to round rod-sections is done in much the same way, the only difference being that it is necessary to bend back the splints slightly whilst the ferrule is fitted. They are tapped back snugly up to the cane again when the fitting is completed, and are later whipped down when the final binding is done.

Fitting ferrules to hexagon split-cane sections sometimes calls for a rather different procedure. If the flat-to-flat diameter of the hexagon is such that only the corners need removing to allow the ferrule to go on, then the ferrule can be fitted in the usual way, by reducing the cane to fit. Little or no strength is lost by removing the corners of the hexagon.

Rather than reduce the diameter of the cane further it is better to use a ferrule the next size larger and build up the cane to fit. This is done by glueing six little slips of wood, or, better still, bamboo, to the six flats at the butt-end of the cane. This built-up length is then rendered down with the file and sand-paper to form a rounded ferrule-seat. Fig. 17 shows how this is done.

The male portions of most splint-end ferrules have small spigots

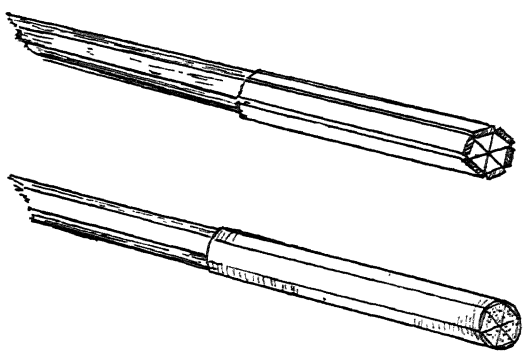


FIG. 17. Building up split-cane to ferrule size

at their ends, the idea being that these should fit into holes in the female ends and so help to distribute the stress. Personally I could never see that these spigots served any useful purpose, and as soon as I get my male ferrules fitted I cut off these protrusions with a hack-saw. I advise you to do the same, rather than fiddle about making holes for the spigots to fit in.

Lastly, a word about the practice of pinning ferrules. You may have seen rods, even commercially made ones, in which the ferrules have been drilled and pinned to the rod-timber. This is definitely bad practice. It weakens the rod at a vulnerable point and, furthermore, it serves no useful purpose. If a ferrule has been badly fitted pinning will not cure the fault. It may stop the ferrule from actually coming off, but it will not make it firm. Take your time and make a good job of the fitting and you will need no pins through your ferrules.

5

Making split-cane (1)

I AM not going to pretend that making split-cane is an easy job, but it is not half as difficult as it is so often made out to be. If you can use a plane you should be able to make split-cane successfully, because that is all there is to it—precise planing.

It is a skill well worth acquiring, for professionally made split-cane is about the most expensive of rod-materials, and if you are compelled to use ready-made sections your financial saving will not be very great. Once you can produce good split-cane yourself from the raw bamboo you can make at negligible cost almost any type of rod there is, from a dainty brook fly-rod to a powerful weapon capable of handling shark. It will give you some idea of the saving in making your own split-cane when I say that I can usually make six or seven roach-rod tops for the price I would pay in a shop for one.

Before we start to consider ways and means let us take a look at this expensive but very desirable rod-material. What, exactly, is split-cane? How is it made and what are its advantages?

Split or 'built' cane is just bamboo, but it is bamboo made to our particular requirements. This, briefly, is how it is made. A bamboo pole is split up, and for each section of built-cane six pieces are planed up into perfectly triangular tapering strips. These are then glued together to form the familiar hexagonal split-cane. (Fig. 18.) Split-cane is not made hexagonal just because this shape makes a pleasant change from round sections. Hexagonal construction is the most convenient way of combining six strips and retaining the maximum amount of the cane's hard outer skin.

The advantages of built-cane are that it can be made to precise dimensions and with any desired taper, or combination of tapers, which makes it possible for the bending performance or action of a rod to be predetermined scientifically. It gives us a solid cane, a desirable rod-material which Nature has neglected to provide. On the other hand it can be made *hollow* if desired and can be used with

advantage for the stiffer rod-sections which are usually made from the natural cane. This may seem like going to a lot of trouble to produce what we already had in the first place, but the advantage, of course, is that the built-cane can be made to precise dimensions.

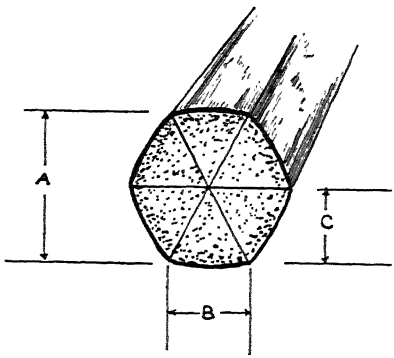


FIG. 18. Hexagonal split-cane
(A) Flat-to-flat dimension. (B) Width-of-flat dimension.
(C) Flat-to-centre dimension or flat-to-apex

The commercial production of split-cane has been mechanized to some extent, but the amateur need not think that his hand-made product must of necessity be inferior to that made by mechanized methods. It may, in fact, be superior to *some* commercially made split-cane. Some of the best split-cane produced is hand-made, the only advantage of mechanization being speed.

Hand methods

The only difficult part about the job is the accurate planing of the strips. The cross-section of these must be a perfect equilateral triangle and the requisite taper must be introduced into each strip, for as the hard outer skin has to be retained taper cannot be achieved after assembly. Such precise planing calls for some form of planing-jig or former.

There are two methods of controlled planing in general use. One is the 'grooved board' technique, which consists of planing the strips progressively in a series of shaped grooves, the final groove producing the required cross-section. The other is the triangular-former method. With this method the strips are glued in turn to a corner of a triangular former and are then planed to conform to the lines of the former.

This latter method takes much longer, as each strip has to be glued to and subsequently removed from the former, but it is probably the most convenient technique for the amateur, to whom the time factor is not of great importance. With the triangular former the job is just a matter of straightforward planing, whereas with the grooved boards a certain amount of skilled manipulation is involved. The necessary grooved boards are not easily obtainable either, nor is the average amateur likely to be able to make his own.

On the other hand, triangular formers can be bought from at least one of the rod-material suppliers, or they can be made fairly easily at home without any elaborate tools. I would advise you to have a go at making your own former, because apart from being a little cheaper it is good practice. If you can make the former you should have no trouble at all making the split-cane.

Making the triangular former

The triangular former can be made from any kind of hard-wood, a convenient size being 5 feet long, with a cross-section an equilateral triangle 3 inch × 3 inch × 3 inch. Fashioning a perfectly true former to these dimensions from solid hard-wood is a formidable task which many a professional carpenter would hesitate to undertake without mechanical aids. I know from experience, because at my own first attempt I tried to hack such a former from a solid oak spar. The weary labour involved and the not very successful result almost caused me to give up the whole business. Happily an old angler-rod-maker introduced me to the 'built-up' method of former construction, an alternative which is a much more practical proposition for the amateur who has only hand-tools.

To make a 'built-up' former you will need three 5-foot lengths of any 2 inch × $\frac{1}{2}$ inch hard-wood, together with three 5-foot lengths of similar wood 1 inch square. These are, by the way, nominal measurements. The actual measurements of the planed wood will probably be $1\frac{7}{8}$ inch × $\frac{3}{8}$ inch and $\frac{7}{8}$ inch square respectively, though they are not really important so long as the timber is straight and uniform.

You will also need an additional 36-inch length of wood exactly as wide as your flat hard-wood strips. Soft wood will do for this, and the thickness is not important. This piece is sawn up to make eleven triangular 'ribs', the sides of which must be *exactly* the width of the hard-wood strips. These ribs are the basis of the former and it is essential that they be exactly alike and perfectly equilateral. Your best plan is make a mitre-box with a 60-degree saw-guide (Fig. 19) to

help you to cut the triangles reasonably accurately. Any slight inaccuracies can be corrected afterwards with file and sand-paper, with the aid of a 60-degree template like that shown in Fig. 23B (*see* page 49). This can be cut from tin-plate, or even stout cardboard, the triangle being marked out with compasses or dividers (or with the

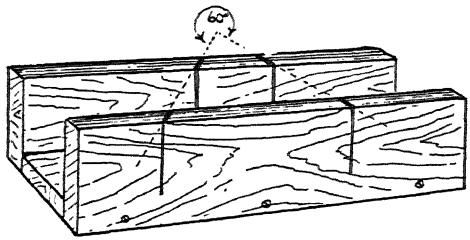


FIG. 19. Mitre-box for accurate cutting of former ribs

aid of a schoolboy's celluloid set-square which you can buy for a few coppers). This template will be necessary later for trueing up the finished former.

These ribs, when you have got them perfectly true and all alike, are then glued at 6-inch intervals along one of the flat strips. (Fig.

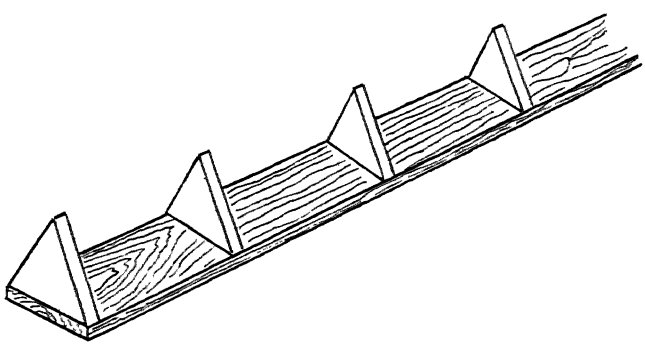


FIG. 20. Ribs glued on at 6-inch intervals

20.) When the glue has set the two remaining strips are added to the other sides making an assembly which, viewed from the end, should look like Fig. 21A. The corners are now planed flat (Fig. 21B) and the square timber is glued on, which brings us to the stage shown in Fig. 21C. The square pieces are now planed away to conform to the

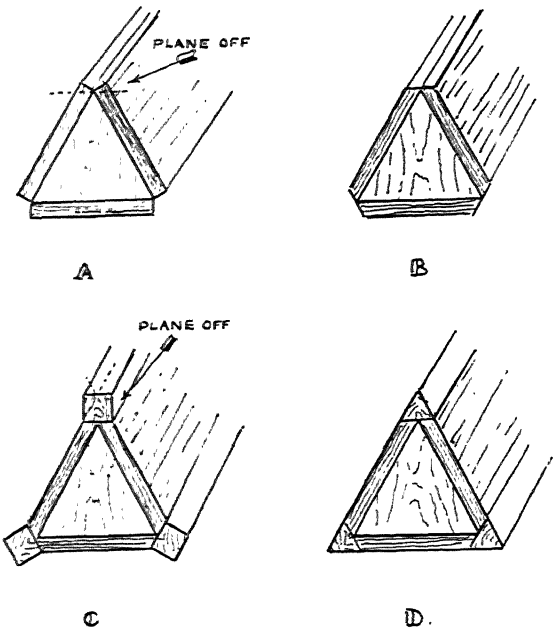


FIG. 21. Stages in the construction of the former

sides, giving a reasonably true triangular former with 60-deg. corners. Any slight inaccuracy can be corrected with the plane, used in conjunction with the 60-deg. template. Do not skimp this final trueing up. Size is unimportant, but the former *must* be *perfectly equilateral.* Otherwise your cane strips will not fit together properly. (Fig. 22.) Your split-cane will be only as good as your former.

FIG. 22. Badly made split-cane. Angles incorrect

Forming the Flat

Before you go any further stain your former all over with black wood-dye (ebony spirit-stain will do). The purpose of this is to act as a tell-tale precaution against any inadvertent shaving of the former

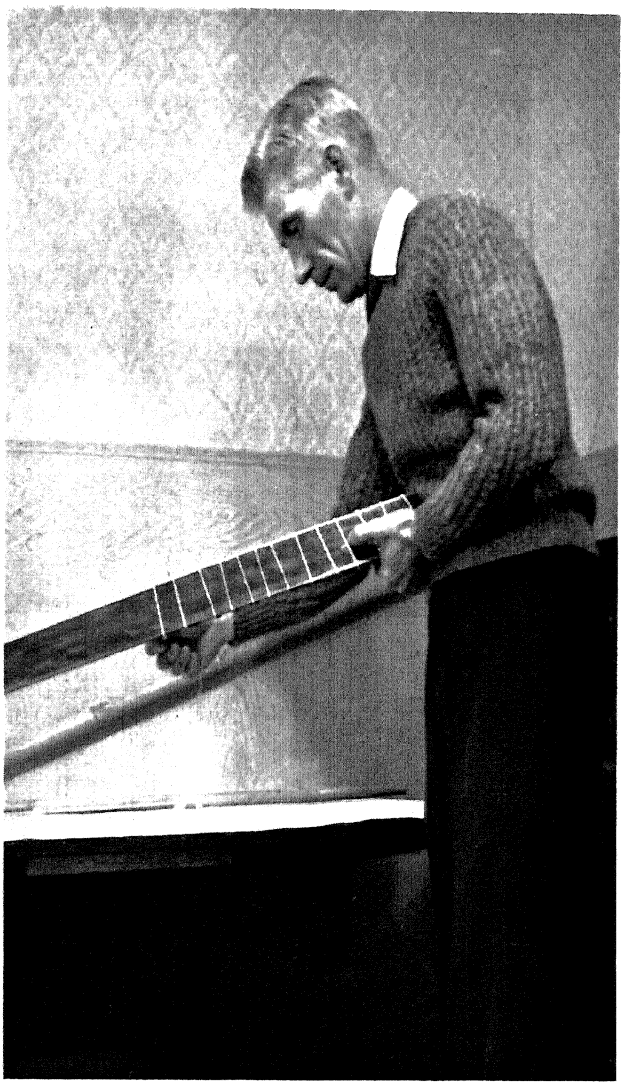


PLATE 3

Tying a glued strip to the former

PLATE 4

Planing a strip

during the planing of the strips. Without this precaution you could well be planing the former as well as the cane strip and not be aware of it—until you come to fit your cane strips together!

One corner of the former must now be planed off to form a tapering flat. (*See* Fig. 23A.) This must be carefully done so that the width and degree of taper of the flat corresponds *exactly* with the flats of your proposed hexagon section of split-cane. This is not as easy as it may seem; in fact, I regard it as the most difficult part of the whole job. It is easy to form a flat *something like* the flats of the

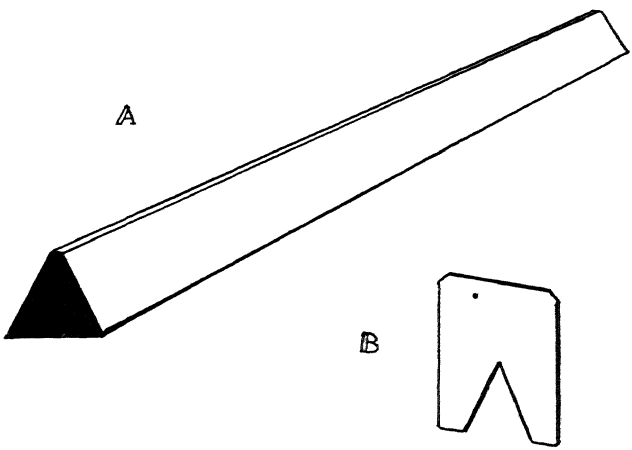


FIG. 23. Finished former and 60-deg. angle gauge
(A) The finished former. (B) Template for checking 60-deg. corners

required section of split-cane, but to make it *exactly* the same is a different matter. In fly-rods, for instance, the rate of taper is not constant from one end of the rod to the other. The taper is varied at certain points to impart a particular action to the rod, and many expert rod-makers claim that it is impossible to reproduce a fly-rod without making a micrometer check on the dimensions at 6-inch intervals along its entire length.

I must admit that this problem of reproducing the exact size of flat on the former baffled me for some time. What little printed instruction I could find on the subject was very vague as to how it was done, and for a time I worked largely by trial and error. I would make up a piece of split-cane, measure its diameter every 6 inches

or so, then modify the flat on the former where necessary. Eventually I got it right, or as near as mattered.

Then one day I hit upon an idea so simple that I cannot imagine why I never thought of it before. It was the simple gadget shown in Fig. 24. This is just a 60-deg. template similar to that which we used to true up the former, but with a sliding cross-member which can be pushed up and down it. You need not be an accomplished

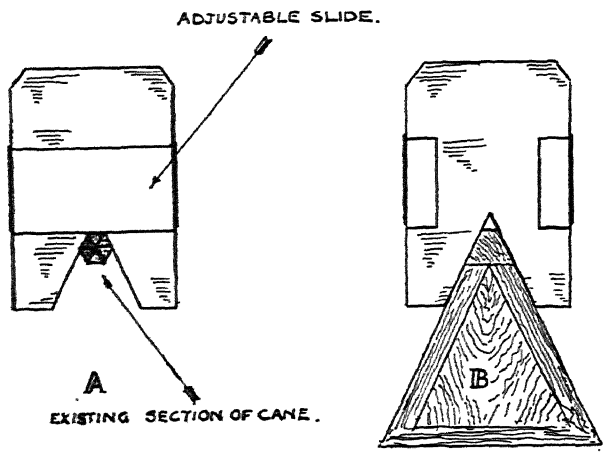


FIG. 24. Front and rear views of gauge for checking width of flat on former against existing cane

metal-worker to make such a gadget; in fact, you can make one in half an hour or so from a piece of a tin-can, with nothing more elaborate in the way of tools that a pair of old scissors.

You can probably guess how this gadget is used. You set the gauge to fit the split-cane you are copying (*see* Fig. 24A), then you use it as a template to check the width of the flat on your triangular former. (Fig. 24B.) Because of a possible change in the rate of taper it is necessary to make such checks at 6-inch intervals along the length of the piece.

Micro-building

The little gadget described solves the problem when you have available an existing length of split-cane against which to check your width-of-flat dimensions. As it stands it is not much help when you have only a list of dimensions to work to. In his book *Rod-Building for Amateurs* Richard Walker gives a very extensive list of split-cane

dimensions; measurements at 6-inch intervals along the entire length of various types of rods of varying lengths. The amateur rod-maker will find this list extremely useful when he has no model to copy—*if* he has the mathematical ability to convert the dimensions to give the necessary width of flat required on the former.

You see, Mr. Walker gives his dimensions not as width of flats, or even flat-to-flat diameters. He gives *half* the flat-to-flat diameter, or in other words, the flat-to-apex measurement of the component triangular strips. (*See* Fig. 18, page 45.) This is very confusing to those not mathematically minded. To obtain the width-of-flat dimensions it is necessary to multiply Mr. Walker's dimensions by 1·155, which is in itself a considerable task when it has to be done at 6-inch intervals along the whole rod by ordinary calculation. Even when you have arrived at the necessary dimensions you are still faced with the problem of checking the width of flat at 6-inch intervals along your former against this list of decimal fractions. You cannot hope to do this without the use of a micrometer, and some means of transferring the micrometer measurements to your former.

By now, I suppose, most readers will be thinking of dumping their carefully made formers into the out-house or lumber-room and abandoning the whole business as being too involved and beyond their capabilities. However, bear with me just a little longer, for I have devised a much simpler way of utilizing lists of flat-to-flat diameters or flat-to-apex dimensions, but you will still need that micrometer.

A few years ago I would never have dreamed of suggesting micrometer measurement for amateur use, for these precise measuring instruments were, and still are, much too expensive to buy for occasional use. In the last year or two, however, there has appeared on the market a very cheap version of the 0–1-inch micrometer which costs only ten shillings. I doubt if a precision engineer would consider using one, for at ten shillings they cannot pretend to equal the proper instrument costing up to ten times that price. Though their accuracy may not stand up very long to the wear and tear of regular machine-shop use they are excellent for amateur rod-making purposes and are well worth the modest price of ten shillings. I advise you to get one.

What did you say? You do not know how to use a micrometer? Well, get to know. There is nothing to it. Measuring with a micrometer is not such a skilled and exacting operation as so many engineers would have us believe. Anyone with average intelligence who can do simple decimal addition should be able to learn how to

use one in an hour or so, from the instructions in any library book on engineering workshop practice. With a little practice you will find it no more difficult than using a two-foot rule.

You will find it almost imposible to measure the width of the flat on your former directly with the micrometer. I check the width of the flat against the micrometer dimensions with an improved version of the little gadget in Fig. 24. This is made from sheet-metal ·020 inch thick and the upper ends of the two component pieces are bent over to form two flanges. (*See* Fig. 25.) The depth of the sliding

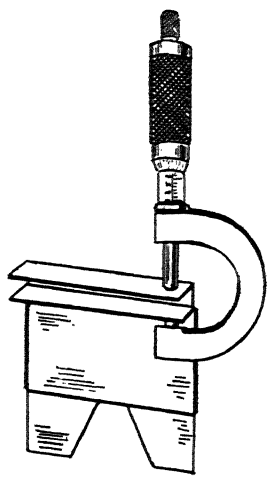


FIG. 25. Modified gauge for checking flat against micrometer dimensions

piece is such that when the two flanges are together, giving a micrometer measurement of ·040 inch, the lower edge of the slider is ·040 inch below the apex of the triangular cut-out. Once you have got the gauge correctly adjusted you can set the measurement across the flanges to *any* flat-to-apex dimension and the gauge will be automatically set for the correct width of flat. (You adjust the gauge for accuracy by filing the lower edge of the slider and checking against an existing hexagon section until the dimension across the flanges is equal to *half* the flat-to-flat diameter of the hexagon setting piece.)

This may all sound very complicated, but if you refer to Fig. 25 you will see that the device is really quite a simple affair and not

difficult to make. With it you will be able to produce split-cane from lists of flat-to-apex dimensions with surprising accuracy.

One last word of warning about the flat on the former. You may be tempted to speed up the job by forming *three* similar flats, one on each corner of the former, so that you can plane up three strips at once. This is definitely not a practical proposition. In the first place, it is almost impossible to form three flats *exactly* alike. Secondly, you will not find it too easy to glue *one* strip of cane to the former, let alone *three*! The other two corners can be used for making strips of different dimensions, but all the six strips for any one section of split-cane should be made on the same corner so that they will be identical.

One other point. Use one of the heat-proof glues throughout the job of making the former, as it will have to be warmed later to remove the finished strips of cane and you must not have the former coming apart at the crucial stage!

6

Making split-cane (2)

FOR making split-cane suppliers of rod-materials sell prime Tonkin cane poles from $1\frac{1}{2}$ inches to $2\frac{1}{2}$ inches in diameter, with wall-thicknesses ranging from about $\frac{3}{16}$ inch to $\frac{5}{16}$ inch. These are usually about 12 feet long and will have to be cut up for delivery, so send cutting instructions with your order. Ask for them to be cut into pieces about 12 inches longer than the proposed length of your split-cane. This may seem a rather wasteful way of cutting them up, but you will see later why this surplus length is necessary.

When your lengths of cane-pole arrive from the suppliers, your first job is to split them into halves and 'bake' them. I believe that commercial manufacturers do actually bake the canes in suitable ovens, but the amateur can achieve similar results by passing the half-canes to and fro over the flame of a gas-jet until they begin to show traces of scorching. This drives out some of the natural moisture and hardens the bamboo considerably.

After baking the half-canes are split down again into strips at least $\frac{1}{8}$ inch wider than the flat on your former. Split them with a blunt, thick-bladed knife such as an old army jackknife, and help it along with a few taps on the back of the blade with a hammer or mallet. Do not attempt to split too near to your required width for a start, for some canes split straighter than others. First split your half-canes into quarters, then split your quarters into two again, and so on, until you are as near to the required width as you dare go without risking running narrow at one end. Good canes split up as straight as a die and give the maximum number of usable strips; others tend to run narrower as the split progresses and it is risky to try to split them *too* near to the required width.

These split strips may be slightly bent, but if they are warmed over the gas-jet they become quite pliable and can easily be straightened. There will be protrusions at intervals where the nodes or knuckles have been and these should be skimmed off with a sharp, finely-set plane, but make sure that you take only the *barest minimum* of

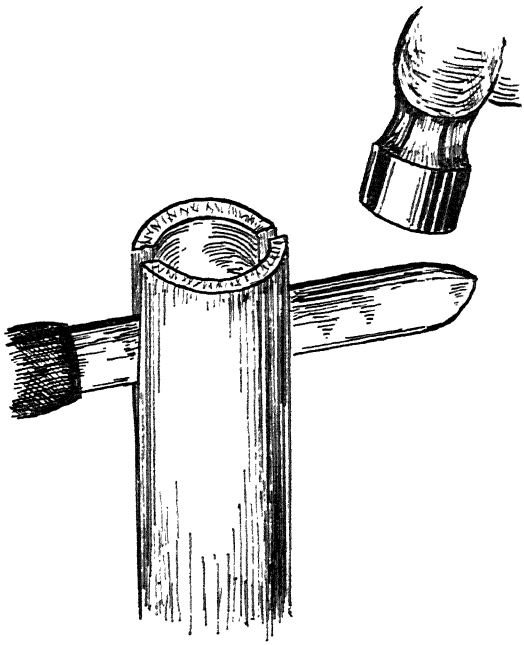


FIG. 26. Splitting the cane pole

material from the skin side of the cane. The job of glueing the strips to the former will be much easier, too, if the roughly split edges are planed up reasonably straight.

Glueing the strips to the former

Before the strips are glued on to the former for planing they must be cut to finished length. Here we see the reason for having the canes cut a foot or so longer than necessary. The potentially weak spots in the strips are the knots where the knuckles have been. With a foot to spare it is possible to stagger these knots when cutting to finished length so that they will not coincide in the assembled split-cane. (Fig. 27.)

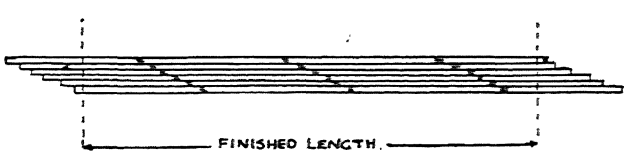


FIG. 27. Staggering the knots in strips

The glue used to fix the strips temporarily to the former should be one of the animal glues which soften when heated, otherwise it will be impossible to remove the finished strips. I use Croid 'Aero', but any glue of the kind that you have to warm up before using will do. The strips are glued in turn to the flat on the former, *skin side down*, and are held in position until the glue has set by a tight spiral binding of strong cord. If the full length of the former is not being used the successive strips must, of course, be located in the same position along the flat. The former should be marked to show where the ends of the strips must be located. Ample time must be allowed for the glue to set so that there will be no danger of the strips coming adrift during the planing operation.

Planing the strips

For this you will need a good steel plane with a screw adjustment for fine setting of the blade. It should be finely set, with the blade honed up to a really keen cutting edge; in fact, it is advisable to have the oil-stone at hand to touch up the blade as the work proceeds, for baked bamboo is quite hard and soon takes off the keen edge.

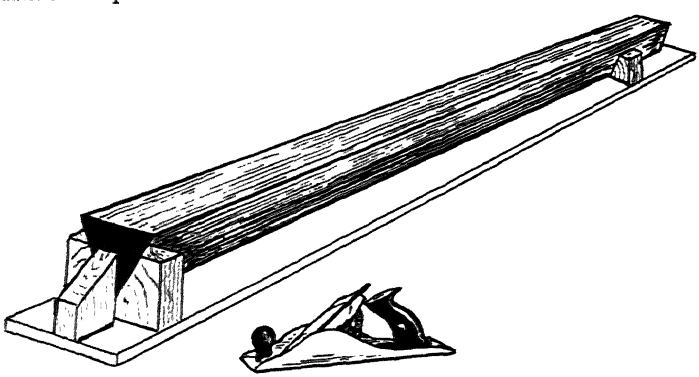


FIG. 28. Vee-shaped cradle to hold former whilst planing

The surplus cane is carefully planed away from the bamboo strip until it is flush with the surface of the former, care being taken not to shave the former or to cant the plane at all during the finishing stages. For the finishing cuts the plane should be re-set to take off only the finest shaving possible. It is an advantage, if you can manage it, to have *two* planes; the second a smaller 'block' plane reserved for the final and critical cuts. If the heavier plane is used to take off the 'meat' the smaller plane can be kept in perfect trim for the

finishing stages. The planing can be done more conveniently if you knock up a vee-shaped cradle for the former, as shown in Fig. 28.

Removing the finished strips

A finished strip is removed from the former by running a hot soldering-iron along the glued joint and at the same time gently prising the strip away from the former with the blade of a knife. If it is inclined to be obstinate in places do not try to force it or you may damage the flat of the former. Just let the hot-iron linger for a few moments to let the heat soften the glue properly. The strips will tend to curl a little as they come away but this does not matter, as they will automatically straighten up in the process of assembly.

After each strip has been removed the old glue must be thoroughly cleaned off the flat by rubbing down with a cloth and hot water. On no account must it be *scraped* off, or the flat may be enlarged and the strips will not be identical.

The preparation of the strips is not a job that can be hurried. Work to a system. Glue a strip on one evening, plane it up and glue on another the following evening, and so on. I find that I can plane up a strip, remove it and glue on another, in a matter of an hour, which means that some six hours' work spread over a week are needed to produce the six component strips for a piece of split-cane.

Assembly

All that remains to do now is to give the six finished strips a liberal coat of glue and to assemble them, skin side outwards, to form the hexagonal section. It is most convenient to assemble the thicker ends first and work progressively towards the thinner ends, coaxing the

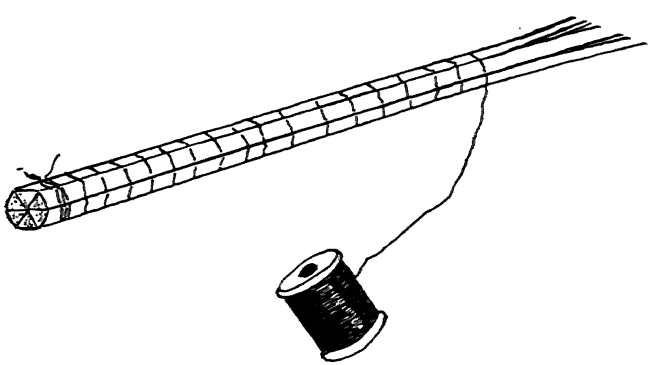


FIG. 29. Assembling the strips

strips into their correct positions as a close tight binding of strong linen thread is wound on. (Fig. 29.) The glue should be one of the casein glues, or better still, formaldehyde adhesive, the kind that is supplied with a separate hardener. The animal glues *can* be used providing that the split-cane is always kept well varnished to exclude any trace of moisture which may cause the glue to deteriorate.

The glued and bound-up assembly should be swabbed down with a damp cloth to remove extruded glue and to damp the cotton binding. The shrinkage of the thread on drying will squeeze the strips tightly together. Until the glue has set the assembly will be quite 'sloppy' and malleable, and any bends or kinks should be straightened out at this stage, for it is impossible to make any correction once the glue is hard. After the final check for straightness the finished piece should be left on a *perfectly flat* surface until the glue has thoroughly hardened.

The completed piece is then carefully cleaned up, a small flat file being used to remove the binding and any remaining excess glue. Finish off with a light sand-papering, dealing with one flat of the hexagon at a time so as not to round away the corners.

Double- and treble-building

For making sea-rods comparatively large diametered split-cane is needed and it will be seen that in the matter of diameter you are limited by the wall-thickness of the cane-pole. This limitation is overcome by double- or even treble-building, or in other words, by using two or sometimes three strips to make each of the triangular segments.

Let us consider double-building, for treble-building is only an elaboration of this. For a double-built section *twelve* split strips are needed instead of the usual six. These are planed up flat and are

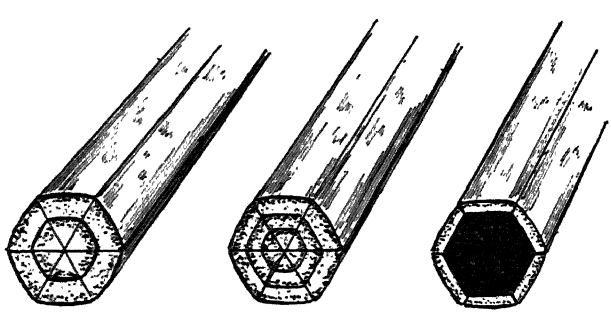


FIG. 30. Double, treble and hollow built-cane

glued together in pairs to make six double strips, using casein or formaldehyde glue so that the component pieces will not part company when heat is applied later to remove the finished piece from the former. Before they are glued together the two strips which make up each double strip should be tapered slightly so that the hard outer

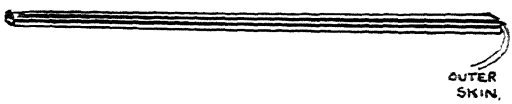


FIG. 31. Pairing strips for double-building

skin of both pieces will be equally distributed throughout the finished triangular strip. (Fig. 31.) A tight spiral binding of strong thread will hold each pair of strips tightly together until the glue hardens.

These six double-built strips are then glued in turn to the former and are planed up and assembled in exactly the same way as in single-building.

Hollow-building

Hollow-building can be done in two ways. In the case of sections of fairly small diameter it is done by making the triangular strips in the usual way and then paring away the pithy wood from the apex of the strips, but leaving the triangular section intact at intervals along the length of the piece and at the ends where the ferrules will eventually be fitted. (Fig. 32A.) A simple jig like that shown will serve to keep the wall-thickness of the hollow portions a uniform thickness.

For building larger hollow sections the block method is used. Each strip is glued to the former and the edges are planed to conform to the lines of the former in the usual way. The upper or pithy side of the strip is then planed down to give the required wall-thickness. Small blocks of some light, soft wood like yellow pine are then glued on at 6-inch intervals, together with longer blocks at the ends where ferrules are to be fitted. The blocks are then planed up, like the strips, to conform to the former.

It is important, of course, that the blocks be located in exactly the same positions on each strip so that they will coincide when the six component pieces are assembled. The glue used to fix the blocks *must* be one of the heat-proof types, or there will be a danger of the blocks coming adrift when the piece is heated to remove it from the former.

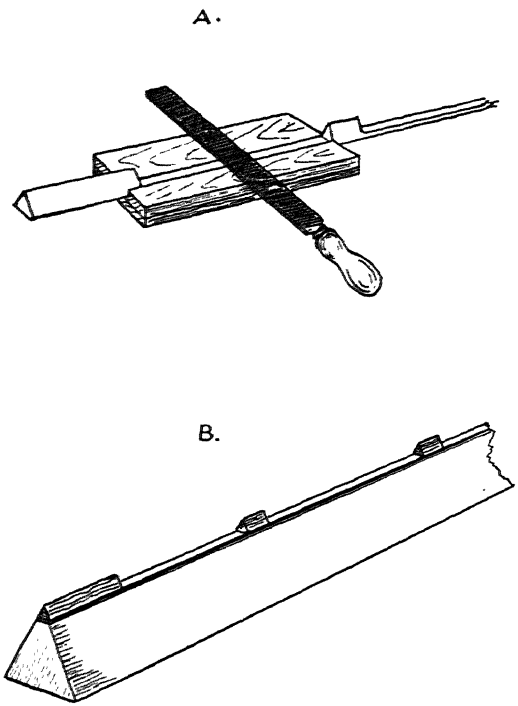


FIG. 32. Hollow-building
(A) Hollow-building from the solid strip. (B) Hollow-building with glued-on blocks

Space will not allow me to go deeply into the intricacies of hollow-building, but Fig. 32A and B should make clear the general principles. Once you can make good solid-built split-cane you will find hollow-building an interesting field for experiment.

Five-sided split-cane

Split-cane does not *have* to be hexagonal, or six-sided. It *can* be made with any number of sides, but five-sided construction (Fig. 33) seems to be the only alternative that has any possible material advantage. Five-sided rods have been on the market in America for years, and at the time of writing they have just made their début over here. The makers claim various advantages for them, as compared with the traditional six-sided rods, the chief one being that five-sided construction gives more power for a given weight of material, due to the fact that with five sides there is a corner instead of a flat on the bend-

ing-plane. Some experts claim that this is a fallacy, and the matter has been hotly disputed in the columns of the angling press, but the makers concerned claim that scientific tests have proved their contention justified.

If you should be won over to the 'five-sides-instead-of-six' school of opinion you can make five-sided rods in exactly the same way as you make six-sided ones. The only difference is that you will have to make a former with an angle of 72 deg. on one corner, instead of the usual 60 deg. The advantage from a constructional point of view

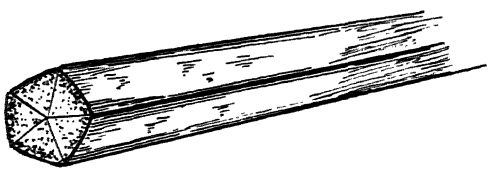


FIG. 33. Five-sided split-cane

is that you will have to make only five strips for each section of split-cane, instead of the usual six. The disadvantage is that you will be able to make use of only two corners of the former if you make it 72 deg. × 72 deg. × 36 deg. and only *one* if it is 72 deg. × 54 deg. × 54 deg. This means that you will need two formers, at least, instead of one, to make a three-joint rod. Personally I hardly think it worthwhile. However, you may like to make a single 72 deg. former suitable for making five-sided roach-tops. A five-sided roach-rod top should in theory work out slightly lighter than a six-sided one of comparable action and in the case of top-pieces where excess weight is least desirable the slightest saving is worth striving for.

7

Fibre-glass

AT ONE time anyone who had suggested glass as a material for fishing-rods would have invited suspicious glances and grave doubts as to his sanity, for fragility is the one quality which we normally associate with this notoriously brittle material. Yet in recent years glass rods have become commonplace, and rather surprisingly their outstanding feature is a remarkable strength and resiliency.

The secret, of course, is that fishing-rods are made from *fibre-glass*, a synthetic material which possesses properties lacking in glass in its familiar state. This fibre-glass is built up from many thousands of fine fibres or filaments which are produced by blowing molten glass through tiny holes, thus producing a filament so fine that miles of it can be produced from a piece of glass no bigger than a large marble. Thousands of these fibres are then bundled together and while under tension they are united with a synthetic resin bonding-agent. The result is the tough, resilient material from which fishing-rods are made.

From a rod-making point of view the greatest advantage of fibre-glass lies in its amazing toughness, glass rods being almost unbreakable by reasonable means. In the early days when glass rods were something of a novelty American manufacturers submitted them to stunt 'field tests' which amounted to deliberate abuse. The treatment these glass rods received during these tests would have made the owner of a similarly treated split-cane rod wince and shut his eyes in apprehension. They were used to lift weights which bent them almost to the shape of a hairpin, without ill effect. They were walked tip foremost into brick walls, yet they survived undamaged. They were bent into alarming curves and left in that state, stapled to a board, for considerable periods, yet on being released they assumed their original straightness without a suspicion of a 'set'. Such treatment is not advisable, of course, even with glass rods, but it does prove that fibre-glass is capable of dealing with any situation likely to arise under normal fishing conditions.

In addition to being strong fibre-glass is hard, durable and impervious to the effects of immersion in water, and as there is no varnish to scratch or flake these glass rods maintain their original smartness and require the minimum of care and attention.

It would seem then, on the face of it, that fibre-glass is the ideal rod-material and, in fact, at one time it was prophesied that this new innovation would completely oust the traditional materials. This, however, has not been the case. Although the American market was flooded with glass rods long before they ever made their appearance over here good split-cane rods are still very much in demand there.

Good built-cane has the advantage over fibre-glass in the matter of power-to-weight ratio. Most experienced anglers will agree, I think, that a fibre-glass rod tends to be 'sloppier' than a good split-cane rod of similar proportions. This deficiency has been remedied to some extent by adopting a hollow construction which permits the use of a larger cross-section without any corresponding increase in weight. The glass fibres are woven into a fine cloth which is wound around a tapered mandrel before bonding, so producing a tubular section. The snag then is that it becomes more expensive to produce, and it means sacrificing to some degree the most valuable quality of fibre-glass—resistance to fracture. One American manufacturer is now trying a new mode of construction, consisting of straight fibres around a spirally wound hollow core, but whether or not this latest innovation will topple split-cane from its pedestal remains to be seen. At the moment I would say that for fly-rods, at least, good built-cane still has the edge over fibre-glass.

There is no doubt, however, that fibre-glass has come to stay. It is an excellent alternative to split-cane, especially for rods like sea-rods which are often called upon to stand up to really punishing treatment and are subject to the ravaging effects of salt-water.

Scope for the amateur rod-maker

The saving in making your own rods in fibre-glass is not as great as is possible with the other materials, for fibre-glass cannot, of course, be fashioned by amateur means, and you have no alternative but to buy commercially made 'blanks'. Still, there is *some* saving and the work entailed is considerably less.

At present complete sets of solid and hollow glass blanks are available for a range of fly-, spinning- and sea-rods. Glass top-pieces can also be bought separately for incorporating into cane float-fishing rods. No preparation is necessary. These blanks have

only to be fitted with the appropriate ferrules and the basic rod is complete, ready for the handle and line-rings.

Fitting joint-ferrules

With fibre-glass it is *especially* important to choose ferrules of the correct sizes, for you cannot reduce the blanks to fit ferrules which tend to be undersize. Splint-ended ferrules are advisable, and you should buy them when you buy the blanks so that you can try them for size in the shop. If you have to send away for the blanks order the ferrules with them, and if you choose a supplier who knows his business he will send the most suitable sizes. The ends of glass blanks are usually finished fairly accurately to one or other of the standard ferrule diameters, and it is usually possible to get ferrules which are a good push fit on the ends of the appropriate blanks.

If you have chosen your ferrules carefully the fitting of them is quite a simple job. First, give the inside of the ferrule and the end of the blank a liberal coat of 'Durofix' and then put them aside until this has hardened. The end of the blank is then given a further coat of adhesive and the ferrule is pushed on whilst this is still tacky. The film of hardened 'Durofix' will make the ferrule a much tighter fit, of course, but if you dip it into hot water for a few moments it will expand enough to allow it to be tapped into position. The ferrule splints are then bound down in the usual way.

Some of the separate top-pieces sold have thin sleeves or ferrule-seats of some softer plastic fused on to their lower ends so that they can be filed and adapted to fit ferrules on existing rods.

If the nearest ferrule-size available is a loose fit on a glass blank the difficulty can be overcome by increasing the diameter of the blank where the ferrule is to seat by winding on one or more layers of silk whipping thread. This binding should be made firm and hard by 'doping' it with cellulose varnish or 'Durofix' before any attempt is made to fit the ferrule.

The fitting of cork handles to fibre-glass calls for no special treatment, except that the glue used *must* be an adhesive of the 'Durofix' type which will adhere to glass. The only bindings needed on a glass rod are those which secure the line-rings and those over the split-ends of ferrules. Intermediate bindings between the rings serve no useful purpose at all and they do not seem to have the same decorative effect on glass as they do on cane. A glass rod always seems to look most elegant with the minimum of 'trimmings'. Varnish is, of course, superfluous. All that is required is a coat of cellulose over the bindings.

PLATE 5

Removing the finished strip from the former

PLATE 6

Shaping a cork handle

In most respects fibre-glass is an excellent material for the amateur rod-maker. It reduces his work to a minimum and enables even the comparatively unskilled to produce a rod with a finish comparable to that of professionally-made ones. For my own part, however, I am not keen about it. I get a lot of pleasure from the work which traditional rod-making involves, and with fibre-glass I never feel that I have really *made* the rod.

8

Shaping greenheart

THE South American wood which we call greenheart is still used quite a lot for roach-rod top-pieces and to a certain extent still for making complete fly-, pike- and sea-rods. It is not as popular as it used to be, but many anglers of the older generation still swear by it for certain types of rods and prefer it to any other material. Nor is this just a die-hard attitude on their part, for as a rod-making material greenheart is not as inferior as so many young anglers imagine.

I believe that tests have shown greenheart to be actually stronger than the best English oak, and with this great strength is combined the suppleness and resiliency so desirable in a material for fishing-rods. Furthermore, greenheart is practically impervious to the effects of immersion in water, fresh or salt, in which respect it is probably equalled only by fibre-glass. The nicest rod I ever handled, I think, was an upstream-worming rod craftsman-built from greenheart. This little rod handled beautifully and its owner assured me that it had been in regular use for *thirty-seven years.* At about the time of his eighty-fifth birthday Mr. A. Edward Hobbs, the 'Grand Old Man of the Thames', told me that he possessed a greenheart rod which he had used regularly for *seventy* years and he estimated that the weight of fish caught with it in that time must have run into tons, including salmon up to 31 lb., pike up to 21 lb., and trout to 12 lb. Which just goes to show that greenheart is not a material to be despised.

The trouble with greenheart is that so much depends upon the choice of timber. You can make a greenheart rod which you will be able to pass on to your grandson, yet on the other hand you may make one which will snap like a rotten stick the first time it is put to the test. To make a good rod or top-piece the timber *must* be straight-grained and well-seasoned. The best greenheart rods are made from 'cleft' timber, or in other words wood which has been split, rather than sawn, from the baulk or plank. As a split invariably follows the grain cleft timber is *bound* to be straight-grained.

Unfortunately cleft greenheart is not easy to obtain. The wood sold by rod-material suppliers is usually *sawn* up, as cleaving produces too much waste to be a commercial proposition. Because of its water-resistant qualities greenheart is much used in the building of lock-gates and other under-water timber-work, and if you ever get a chance to beg or buy an off-cut from such a job you may pick up a piece of first-class timber which you can split up for yourself. I once made two excellent pike-rods from a piece which I picked up for the price of a couple of pints of bitter!

Shaping greenheart

If you possess a good plane it is not a difficult job to fashion rounded and tapered sections from the rough square. With practice it is possible to acquire the knack of doing this entirely by eye, but for a start you will probably need a guide or planing-jig of some kind. This need not be an elaborate affair; in fact, you can knock one together in half an hour or so, from any suitable oddments of timber.

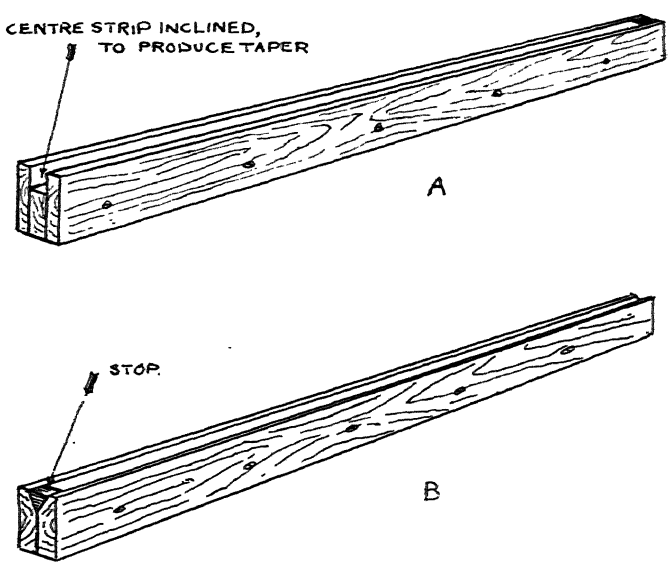


FIG. 34. Planing-jig for greenheart
(A) Planing-jig with tapered square groove. (B) Planing-jig with vee-groove

Make a start by planing up your rough greenheart until it is reasonably square and rather larger in section than the diameter of the piece you intend to produce.

The planing-jig

Next make a grooved planing-jig like that shown in Fig 34A. This is simply a straight strip of wood sandwiched between two broader strips, the three being screwed together to make a grooved assembly. The centre strip should be as thick as your squared greenheart and should be inclined slightly to produce the required amount of taper. (Fig. 34A)

The method of using this rough jig should be obvious. You lay your squared greenheart in the groove and plane it down until it is flush with the outer strips of the jig. You then put it the other way and do the same with the adjoining edge. This gives you a *tapered* square, measuring across the flat the approximate diameter of your intended round section.

The vee-board

Your next job is to plane off the corners of your tapered square to reduce it to an octagonal section. You will be able to do this most conveniently if you make yourself a planing board with a vee-groove in it. Again, this need not be an elaborate affair. The simplest way to make one is to screw together two chamfered strips as in Fig. 34B. If you are stuck for timber you can dismantle the other jig and use the two outer strips to make your vee-board. Of course, if you intend to do any amount of rod-making and are likely to be making several similar pieces such as roach-rod tops it will pay you to make a permanent jig with a square groove on one side and a vee-groove on the other as in Fig. 35.

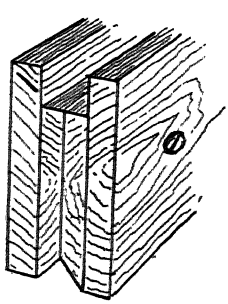


FIG. 35. Planing-jig with both square and vee grooves

Scraping and finishing

When you have achieved the octagonal shape you should lay aside your plane and do the final rounding with a cabinet-maker's scraper and sand-paper. Do the scraping with the piece laid on a flat surface and check frequently with your callipers to make sure that you are keeping it perfectly round. If you do not possess a proper scraper you can manage the job quite well with a stout-bladed pocket-knife; in fact, I have seen quite creditable top-pieces rounded off with nothing more elaborate in the way of tools than a piece of broken glass!

The final smoothing up is done with sand-paper, but you must be careful not to spoil the taper by sand-papering too vigorously in one particular spot.

One big advantage with greenheart is that it can be modified by further scraping if the action of the rod is not quite to your liking. With split-cane no alteration is possible once the job is finished. Always leave greenheart sections rather full in diameter. You can then whip on the rings temporarily and try the rod for action before you do the final whipping and varnishing. If it is inclined to be too stiff a little further scraping will soon put matters right.

The knack of shaping greenheart is well worth acquiring, if only for the purpose of making top-pieces. Replacing carelessly broken tops is a task that the amateur rod-maker is often called upon to do for friends and acquaintances. Even if the broken top is of split-cane a greenheart replacement will tide the angler over until he can get a split-cane one made. A greenheart top is soon made once you acquire the knack. Many a time I have burned the midnight oil making a replacement top, so that an angler could go fishing on the morrow!

9

Handles and grips

ONCE you have completed the basic 'skeleton' of your rod your next job is to furnish it with a handle and some means of securing the reel.

Handle dimensions

The first question which arises is: how long and how thick should the handle be? Even if you are copying a particular rod you may be able to improve upon your model, if it is an old one, by fitting a longer handle. There is a tendency nowadays to make handles rather longer than they used to be, because of the increasing use of reels of the fixed-spool and multiplier types which are almost always positioned above the hand. Below is a list of the average handle lengths favoured by the tackle-trade.

Type of rod	*Rod length*	*Handle length*
Float-fishing rods	9′–10′	18″
	11′	21″
	12′–13′	24″
	14′–15′	27″
Single-handed fly-rods	Up to 10′	12″
	12′	20″
Single-handed spinning-rods	Up to 8′	15″
	Over 8′	21″
All double-handed casting-rods		27″

Ideally the handle-diameter should be governed by the size of the user's hand, for a sixteenth of an inch larger or smaller in diameter can make a difference from the point of view of comfortable handling. A fly-rod for a boy or a lady may need a handle-diameter as small as $\frac{7}{8}$ inch, whereas a double-handed casting-rod for a man with large hands may need a handle as thick as $1\frac{1}{4}$ inches.

If you are making the rod for yourself you can make the handle 'to measure'. Handle as many rods as you can lay your hands on, and when you find one which feels really comfortable in your hand measure up the handle-diameter with your callipers. However, if you are making the rod with no particular user in view you will be suiting the average person if you settle for 1-inch diameter for small rods and $1\frac{1}{8}$ inches for the larger ones.

Bored cork handles

There are various ways of making rod handles, but the most common method is with bored corks. Nine rods out of ten, I would say, have handles built up from bored corks, the method being suitable for almost all rods with butt-joints up to $\frac{3}{4}$ inch in diameter.

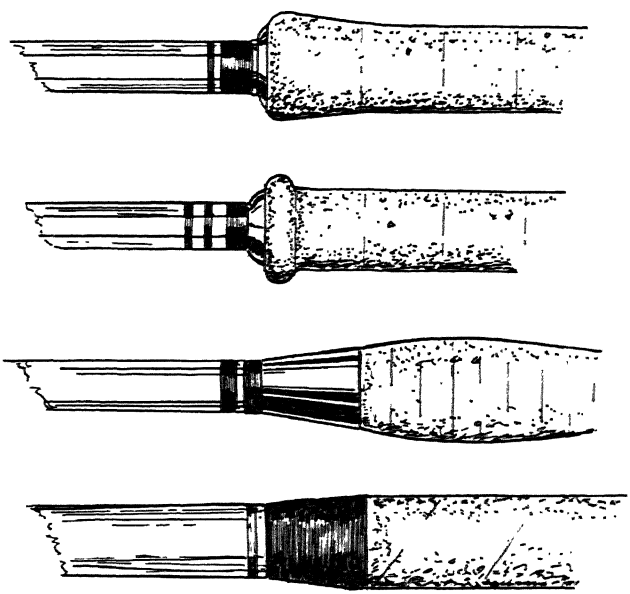


FIG. 36. Some shoulder patterns for cork handles

Two grades of these bored corks are available. The best quality are in the form of cork rings about $\frac{5}{8}$ inch thick, these being especially suitable for the lighter types of rods such as trout fly-rods and light spinners. For the larger rods with longer handles an excessive number of such rings are necessary, and it is quite satisfactory and much more economical to use the rather cheaper bored cork bungs

which are about 1½ inches long. Both rings and bungs are available with various outside diameters and with bored holes ranging from ¼ inch to ⅝ inch.

Making a continuous bored cork handle

There are various handle-patterns that you can adopt (*see* Figs. 36 and 37), but for a start let us consider the making of a plain continuous handle. First decide how long your handle is to be, then calculate how many corks you will need to make up that length.

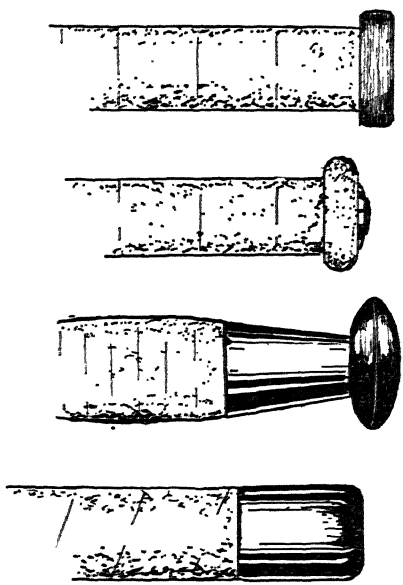


FIG. 37. Some butt-end patterns for cork handles

Choose corks with an outside diameter rather bigger than your intended handle-diameter, with a bore which is a tight push-fit on your butt-joint. It is better to get corks too small in the bore, rather than too big, for you can easily open them out to the required size with a coarse round file. If there is taper in the length to be corked choose your corks to fit the thinnest end and open them out to suit the thicker parts.

For fixing your corks you will need a tin of glue and a small brush, a tin and brush being much more convenient than fiddling

about squeezing tubes and spreading glue with your finger. A waterproof cement such as 'Durofix' is usually recommended, but I do not think this really essential. I have at times used the ordinary animal-glues with quite satisfactory results and no subsequent complaints. After all, rods were being fitted with cork handles long before the invention of modern adhesives and many of them are still being wielded with their original handles.

Mark on your butt-joint the extent of the handle and then push on your corks one by one, applying a dab of glue to the cane and to the mating faces of the corks as they are pushed into position. If you grasp your corks tightly around their circumference as you are pushing them on they will be less likely to split. If the length to be corked is parallel you can push on your corks from the butt-end, but if there is a certain amount of taper you will have to slide them

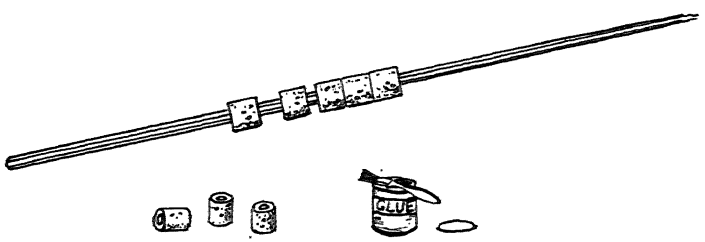


FIG. 38. Building-up a handle with bored corks

down from the thinner end. Whichever way you do it, leave the last three inches at the butt-end uncorked for the time being.

When the glue has set and the corks are firmly fixed you can start reducing the rough handle down to size with a file and sand-paper. You will find this a very dusty job, so do it in the open air, and when you come to the sand-papering stage I advise you to tie a handkerchief over your mouth and nose. It will save you swallowing a lot of fine cork-dust.

Remove most of the excess cork with the flat side of a half-round file, beginning at the bottom end and working along to a point about 3 inches from the upper end. For the time being leave these last 3 inches as they are. Use long strokes and keep the file at an angle of about 45 deg. to the axis of the handle. Do not be tempted to use too rough a file or to try to take off too much at once, or you will pluck pieces out of the cork and later have the trouble of filling the unsightly holes you have made.

Set your callipers to about $\frac{1}{16}$ inch more than the finished handle-diameter and check frequently with them to ensure that you are keeping the handle round and parallel. When you get down to calliper size dispense with the file and finish off with sand-paper wrapped around a wooden block. Before you start sand-papering, however, blow all the dust from your handle and inspect it for any cracks or holes. If you find any, squeeze a little tube glue into them so that as you are sand-papering the dust will mix with the glue and fill up the crevices. If you have been unfortunate and have made any sizable holes you will have to fill them individually with a stopping made by mixing cork-filings with a little glue.

Use a medium grade of sand-paper and carry on rubbing the handle down until the reel-fittings will just push on with a little persuasion. A final rub with finer sand-paper will make the handle nice and smooth and ease the fittings to a neat, sliding fit. When you have got the reel-fittings on you can add the remaining corks to the butt-end.

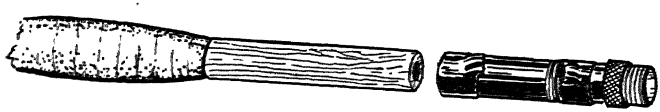


FIG. 39. Fitting a screwed-sleeve reel-fitting

Now to deal with the three inches at each end which have been left standing proud of the rest of the handle. These ends are shaped with file and sand-paper, using the rounded side of the file where necessary, to form bulges which will prevent the loose reel-fittings from coming off the handle. How you shape them will depend upon which handle-pattern you intend to adopt. Figs. 36 and 37 (*see* pages 71 and 72) show the popular styles.

If your rod is a fly- or spinning-rod you may wish to incorporate a screwed-sleeve reel-fitting (Fig. 39) either at the extreme bottom end or part way along the handle. There are two ways of doing this. One is to cork the butt in the usual way and then reduce the cork in the appropriate place until the sleeve-fitting is a tight, push-on fit. The cork should be liberally smeared with 'Durofix' before the sleeve is pushed on.

It is better still if you can replace the corks where the sleeve is to be fitted with a bored wooden sleeve which is a tight fit in the reel-fitting and a push-fit on the cane of the butt. This wooden sleeve must be carefully made, however, with the hole bored true in relation

to the outside diameter; otherwise the fitting will not be in alignment with the rest of the handle. A wooden sleeve makes a much firmer job, as the reel-fitting can be drilled and pinned firmly to the wood.

Shaped grips

The general trend nowadays is towards plain, parallel handles, but shaped grips are still quite popular for fly-rods. If you fancy a shaped handle you cork the required length of the butt in the usual way and then shape it to the desired profile with a half-round file and sandpaper. It will help you to keep the grip shapely and symmetrical if you first make a cardboard template of the shape to check the profile as the filing progresses. (Fig. 40.)

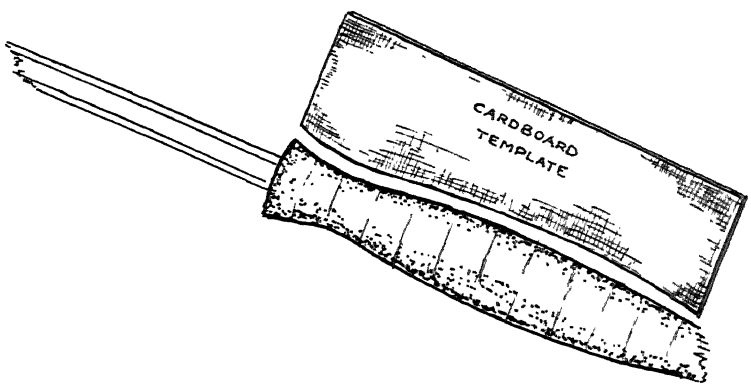


FIG. 40. Making a shaped cork grip

Wrapped cork handles

Bored-cork construction is not the most economical for rods with large diameter butt-joints, such as match-rods and certain types of sea-rods. When you need corks with bores of $\frac{3}{4}$ inch and upwards you are getting to the stage where you need more hole than cork! Providing that the handle is to be a parallel one a cork wrapping is just as satisfactory and much cheaper.

For a wrapped handle you will need some 2-inch broad cork strip, or some sheet cork from which to cut such strips. It can be either natural cork or cork composition, both being obtainable in $\frac{1}{16}$-inch and $\frac{1}{8}$-inch thicknesses. The thickness required will depend, of course, upon the diameter of butt-joint in relation to the finished handle-diameter. For instance, $\frac{1}{8}$-inch thick cork round a $\frac{7}{8}$-inch diameter cane would give a $1\frac{1}{8}$-inch handle-diameter.

Fig. 41 shows how the wrapping is done. The length of butt to be corked is given a coat of glue and the end of the cork strip is firmly bound on at the upper extremity of this handle-length. It should be bound on at an angle of about 45 deg. to the axis of the handle, so that the strip will wind spirally around the butt. As the strip is wound on a spiral binding of thick string is laid over the top of it to hold it in position until the glue has set. If you grasp the wrapped portion and give it a slight twist from time to time as you proceed the turns of the spiral will be squeezed tightly together. When the wrapping reaches the end of the cane, bind the end of the cork

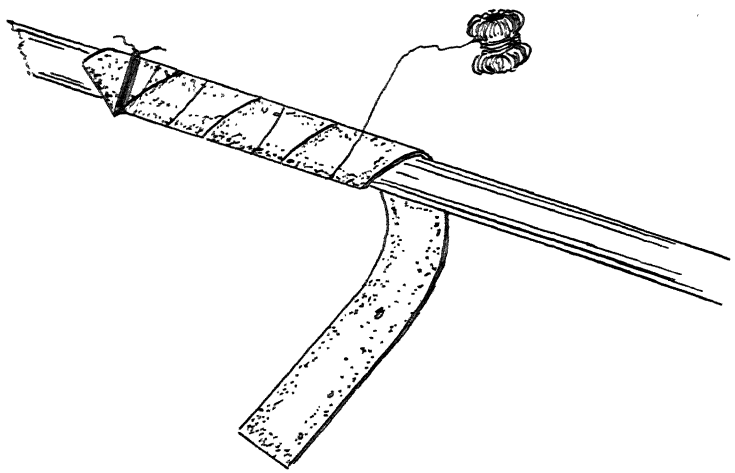


FIG. 41. Wrapping with cork strip

strip firmly so that it will not uncoil and put the job aside for a while until the glue has thoroughly set.

Once the glue has set you can remove the temporary string binding and trim off the ends of the cork with a sharp knife or razor-blade. The handle is then rubbed down with sand-paper until the reel-fittings are a neat fit.

Putting on a cork wrapping is one of those jobs which make you wish you had four hands instead of two, and for your first few attempts, at least, it is a big help if you can get someone to assist you by following up with the string binding as you lay on the cork strip and twist the turns tightly together. Here is a tip. Before you start to wind on the cork pass the strip to and fro in the steam from a kettle for a moment or two. This will make the cork more limp and

pliable and there will be less likelihood of it cracking as you wind it around the cane.

With cork-wrapped handles no shaping is possible, of course, so you cannot form bulges at the ends to retain the loose reel-fittings. However, if your fittings are a neat fit, as they should be, a narrow whipping of strong thread at each end of the handle will serve the same purpose.

Cord grips

A cord grip is a cheap and serviceable alternative for a large diameter butt-joint and is often used on sea-rods. From suppliers of rod-materials you can buy a heavy cotton cord in 40-yard hanks, especially for the job. You just glue the required length of the butt-joint and then wind on the cord, closely and tightly. Fig. 46 in the chapter on binding will show you how to make fast the ends of the binding. The finished cord-grip should be given a couple of coats of good, hard-drying varnish to protect it.

Wooden grips

Varnished wood grips are sometimes used on sea-rods, perhaps more so in America than over here. In my opinion they are the most practical grips of all for salt-water rods and they can be quite handsome if they are of a shapely pattern and made from some nicely grained wood. Unfortunately it is impossible to make really elegant

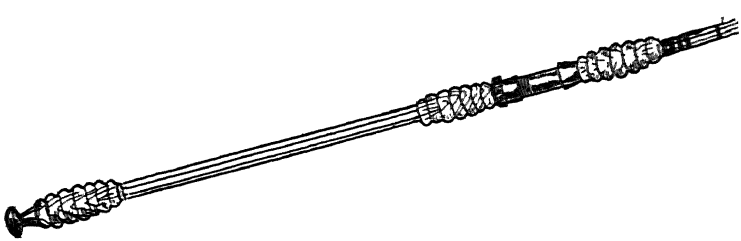


FIG. 42. Sea-rod with wood grips

wood grips without the use of a lathe. Still, in this 'do-it-yourself' age power-tools for amateur use are becoming commonplace, and you may be able to persuade some wood-worker friend to turn up some wood grips for you. Fig. 42 shows a typical sea-rod handle with wooden grips. To make the grips the wood is bored to fit the cane and the outside diameter is turned to the desired profile.

Butt-caps and shoulder-collars

In recent years the tendency in rod-making has been to dispense with metal butt-caps and shoulder-collars on rod-handles, on the grounds that they only add to the weight and the cost. There are still a great many anglers, however, who still like them. I like them myself, in fact. I always think they give a pleasing finish to a rod. Fitting them is not a difficult job. You shape the shoulder and butt-end of the handle cork until they are a good tight fit in the appropriate fittings.

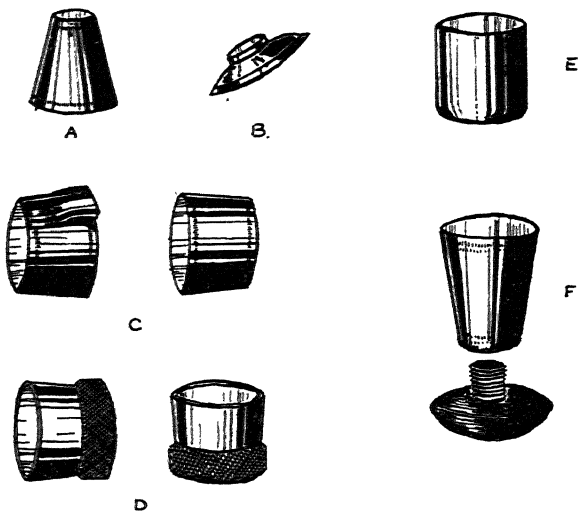


FIG. 43. Some handle fittings

(A) Taper-collar shoulder-fitting. (B) Disc-type shoulder-fitting. (C) Plain brass reel-fittings. (D) Knurled duralumin reel-fittings. (E) Plain butt-cap. (F) Tapered butt-cap with rubber button

In the case of a shoulder-collar a smear of 'Durofix' before the fitting is pushed on, and then a band of whipping immediately above it, is all that is required to secure it. The butt-cap is liable to more hard knocks, and is subject to considerable leverage if a rod-spear is used in conjunction with it, so a much firmer fixing is necessary. The best way is to drill right through and then tap in a pin made from brass wire of a suitable gauge. The ends of the pin are snipped off close, burred up with a few taps with a light hammer, then filed off flush with the surface. If you do this you will not be troubled with the butt-cap dropping off. You would not find it too easy to get it off if you tried!

10

Binding

ALL too often you can identify a rod as being home-made by its very amateurish binding and varnishing. Many amateurs seem able to produce rods which are quite creditable up to a point, but when it comes to the binding and varnishing they fall woefully short of professional standards. Why this should be I do not know, for there is nothing *really* difficult about either job. Possibly an urge to see the rod finished causes beginners to be rather less painstaking in the final stages.

The binding and varnishing is, I think, important. Well done it can make a bad rod look like a good one; crudely done it reduces considerably the value of a rod that is otherwise first-class. Some expert anglers will disagree with me on this point, no doubt. They will argue that a rod should be drab and inconspicuous to the quarry, and that a smart colourful finish is, in fact, detrimental. There may be something in what they say, but, for my own part, I like a rod which is attractively finished and pleasing to look at. And, believe me, if you ever try to sell any rods you will find that nine anglers out of ten are of the same mind! However, it is up to yourself whether you give your rod a drab 'functional' binding or a highly ornamental two-tone wrapping in your favourite colours. The procedure is very much the same.

Marking the ring positions

The first step in the binding of any rod is to plan and mark the positions of the line-rings. Here you may be able to improve on many commercially-made rods, for in a lot of shop-bought rods there is a tendency to skimping in the number of line-rings. There should be at least a ring for every foot of the rod's length excluding the cork handle. This does not mean, however, that the rings should be exactly spaced at 12-inch intervals. Apart from the fact that it is not the most efficient arrangement, equally-spaced rings on a tapering rod do not look artistically correct. The spaces between the rings should decrease progressively toward the tip. Plan your spacing with pencil and paper, juggling with the dimensions and dividing up

the available length so that as you progress toward the tip each space is an inch or so less than the preceding one.

This is the ideal arrangement, but in the case of whole-cane rods it is often an advantage to vary this precise spacing slightly in order to locate rings at the points where the knuckles of the cane have been, thus camouflaging any unevenness. If you locate your rings on the knuckles where possible and bear in mind the possibility of using intermediate bindings to cover those knuckles which do not coincide approximately with the line-ring positions you can usually make it almost impossible to detect where the original knuckles have been.

There is one other point about the placing of rings. The lowest, or butt-ring, should not be placed too near the cork handle. There is no advantage in having it close to the handle, and if it is so placed it is a check to casting, especially if a fixed-spool reel is used. This is a common fault with many match-rods when used in conjunction with fixed-spool reels. A fixed spool cannot work at anything like maximum efficiency without a large-diameter butt-ring placed well away from the handle.

Choosing and preparing the rings

Make sure you buy the right type of rings for the rod and buy the best you can afford, for it is no use making a good job of the binding

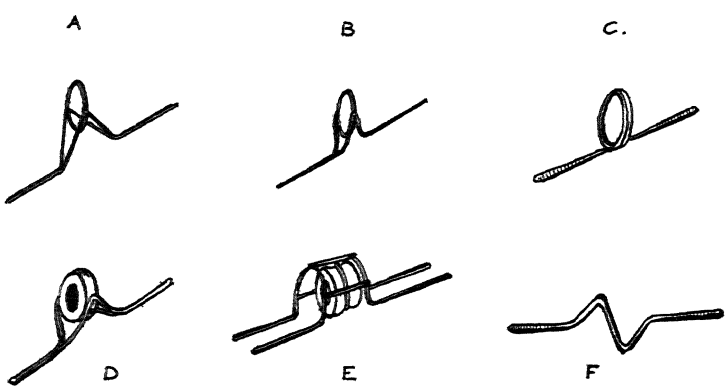


FIG. 44. Types of line-rings

(A) 'Bell's Life' rings—for light float-fishing rods. (B) 'Full-open' bridge rings—fly and spinning-rods, ledger rods. (C) 'Double Upright'—sea-rods, pike-rods and in smaller sizes for the cheaper float-rods. (D) Agate-lined rings—used as first or butt ring on all good rods. Sometimes used throughout. (E) Guarded porcelain—used on good sea-rods and sometimes on salmon-rods. (F) Snake rings—for fly-rods (now almost obsolete)

PLATE 7

Whipping

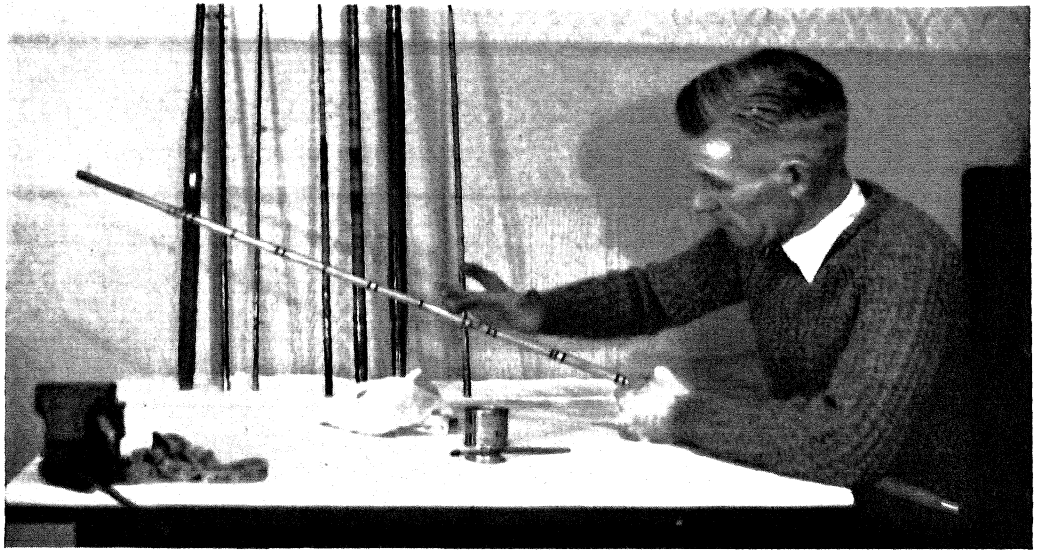


PLATE 8

Varnishing

and varnishing if you are going to have to spoil it all soon afterwards replacing faulty line-rings.

Figs. 44 and 45 show the different kinds of rings used for the various types of rods. It is better, I think, to buy the rings sold singly, in preference to the carded sets. With these you can fit just as many rings as you wish, and you can always get identical replacements in the event of wear or breakage. On most of the rings you buy the 'feet' are thicker than need be, a fault which causes unsightly steps in the ring-bindings. Before you fit them grip them with the pliers and file the feet until they taper off to a feather edge.

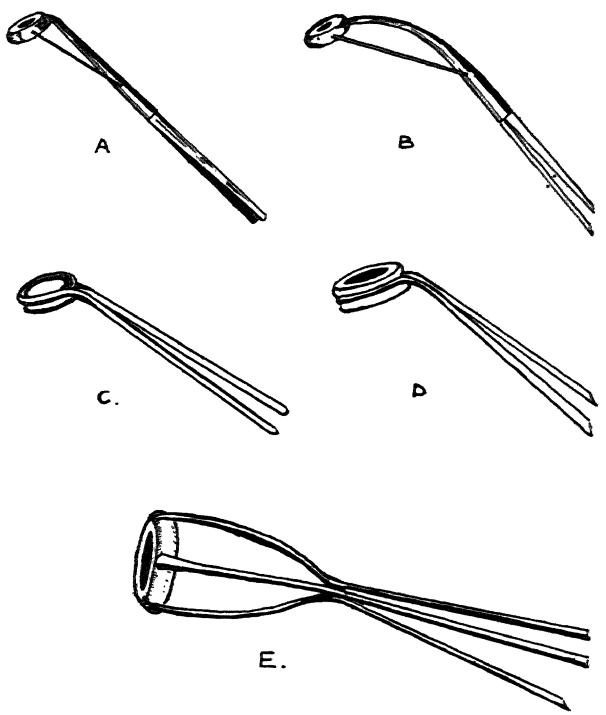


FIG. 45. Types of tip rings
(A) Agate-lined—used in conjunction with low bridge-rings. (B) Swan-necked agate-lined—used in conjunction with high 'Bell's Life' rings. (C) Plain wire—used on cheaper rods. (D) Porcelain-lined—for sea or pike rods. (E) 'Tulip' type—used on good sea-rods

The ring-bindings

At first whipping seems a slow and tedious business, but speed and ease soon come with practice. The materials you will need are:

(*a*) A supply of whipping-silk of the desired colour, or colours if it is to be a 'two-tone' job.
(*b*) A tube of 'Durofix' or similar adhesive.
(*c*) A roll of 'Sellotape'.
(*d*) A razor-blade.
(*e*) A draw-loop, made by doubling and knotting an eight-inch length of nylon fishing-line.

A fine silk thread is sold especially for whipping, and for the more slender rod-sections this is the stuff to use. For the stouter rods, however, the rather thicker sewing-silk is quite satisfactory. It makes a bulkier binding, but this is not too noticeable on the larger diameter rods. In recent years a new whipping material has appeared on the market, in the form of a very fine-gauge Terylene yarn. I consider this superior to silk, but at the time of writing it does not seem to be available in such a wide range of colours.

The draw-loop of nylon monofilament is an idea of my own. For securing the loose end when finishing a binding most rod-makers use a draw-loop of ordinary thread, but as we shall see later a loop of monofil is a decided improvement.

Before commencing whipping make yourself comfortable under a good light and place all your materials conveniently to hand. Start with the ring nearest the handle, not forgetting to first slip on the metal shoulder-collar if the handle is to be fitted with one. (This will be secured in position later with a band of whipping placed immediately above it.) Place your first ring in position and secure it temporarily with a strip of 'Sellotape' wrapped around one of the ring's feet.

Now take your reel of whipping-silk and lay the end alongside the unattached foot of the rod-ring, then start to wind on the silk over the top of it, firmly and without overlapping. (*See* Fig. 46A.) After a few initial turns you will find it more convenient to twirl the rod and pay on the silk, rather than wind the silk around the cane. When the whipping reaches a point just past the end of the ring foot lay your nylon draw-loop along the binding and make a further dozen or so turns over the top of it. To finish the binding break off the silk and pass the loose end through the draw-loop. Pull on the loop and the free end is drawn back underneath the last dozen turns, so securing it. (*See* Fig. 46B.)

The protruding ends of silk are then snipped off close with the razor-blade and a coat of 'Durofix' is applied over the binding to

fix it. Spread the 'Durofix' by rotating the binding between thumb and forefinger. This will smooth down any 'whiskers' that have been raised on the silk, though you will keep these to a minimum if you make a habit of paying on the silk direct from the spool without guiding it through thumb and forefinger. It is the roughness of the dry fingers which fluffs up the silk.

When you have pulled the loose end back under the whipping

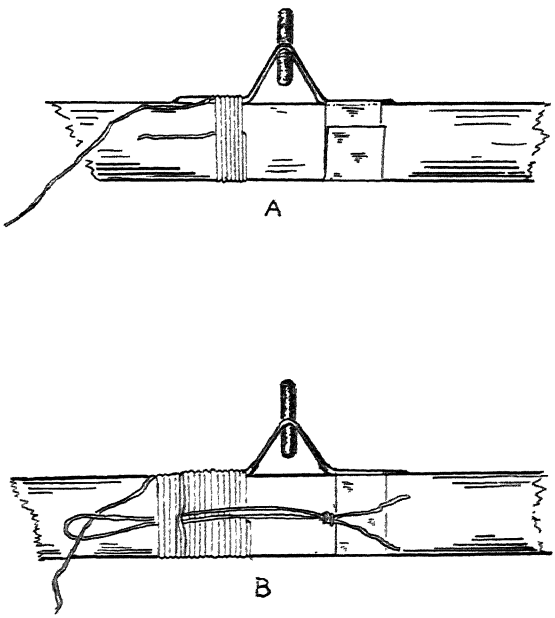


FIG. 46. Beginning (A) and finishing (B) a whipping

you will notice that the springy nylon loop opens itself out ready for use again. That is the advantage over a loop of ordinary thread. With thread you have the trouble of poking open the loop every time you use it.

When one foot of the ring has been firmly bound on you can remove the temporary 'Sellotape' binding and deal with the other foot in the same way. The other rings are dealt with in the same way, but make sure that you keep them all in perfect alignment. With split-cane they line up automatically, as they are all seated on the same flat of the hexagon, but with round rods you will have to line up each ring with the preceding one when you attach it with the

'Sellotape' wrapping. You do this by squinting along the rod as though you were sighting a rifle and adjusting the ring until it appears centrally placed when viewed through the aperture of the preceding one.

In the case of the tip-ring a certain amount of fitting is needed before the ring is bound on. For plain tip-rings a flat must be filed on each side of the rod-tip for the fixing-prongs to seat on. (Fig. 47.) If the socket-type of tip-ring is used the extreme end of the tip must be filed to fit snugly into the socket and two flats must be formed immediately below to accommodate the prongs. (Fig. 47.)

Reinforcing bindings

So much for the ring-bindings. The next step should be to put on any other 'functional' wrappings, or in other words, any other bindings which serve a specific purpose other than mere decoration. The extent of these will depend upon the type of rod. For instance, a ferrule-less match-rod will need bindings over the splices and end-bindings to reinforce the female ends of socket-joints. Rods fitted with splint-ended ferrules will need whippings over the ferrule-splints.

Whippings over splices and ferrule-splints are just straightforward bindings like those which secure the line-rings, but the female ends of match-rods need a special sort of binding called the 'locked' whipping, the purpose of this being to prevent the whole binding from unwinding should the vulnerable end-turns become frayed.

The locked whipping

To begin a locked whipping snip from your reel of silk half a dozen 4-inch lengths and double them. Space these equally around the circumference of the end of your cane and secure them in position temporarily with a strip of 'Sellotape'. (*See* Fig. 48.) Now start to whip over them in the normal way, but when you have laid on about half a dozen turns double back the projecting loops and continue to wind over the top of these also. When the binding has progressed about half an inch or so make it fast temporarily with a dab of 'Durofix' while you remove the 'Sellotape' and snip off what remains showing of the locking-loops. Having disposed of all the protruding ends carry on and finish the binding in the usual way.

Intermediate bindings

Intermediate bindings between the rings are largely a matter of taste. Most rods are just as reliable without them, but most anglers like

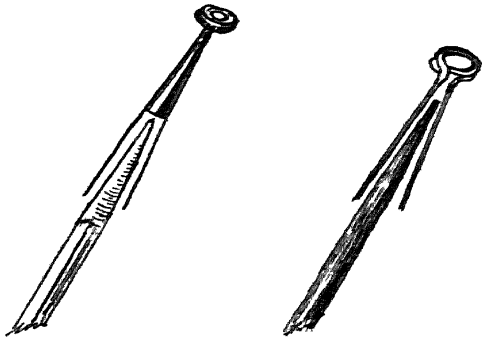
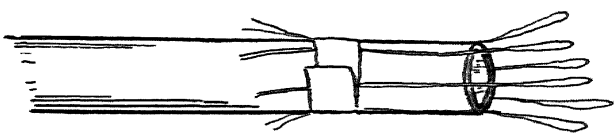


FIG. 47. Fitting tip-rings



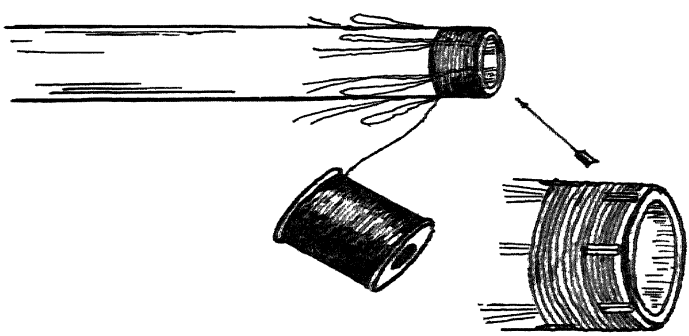


FIG. 48. Making a 'locked' whipping

to have them as they take the bareness off a rod and give it a more pleasing appearance. In the case of Spanish Reed and bored Tonkin they do serve a practical purpose in reinforcing the fragile material, and these canes should always be wrapped with narrow bands of whipping at closely spaced intervals. Broader bands should be laid over the nodes or knuckles.

Well-made split-cane does not really need intermediate whippings, but closely spaced narrow bands between the rings give a pleasing effect which is very popular in fly- and spinning-rods.

If you *do* put on intermediate bindings do not put them on haphazardly. Work to a definite scheme and measure out and mark

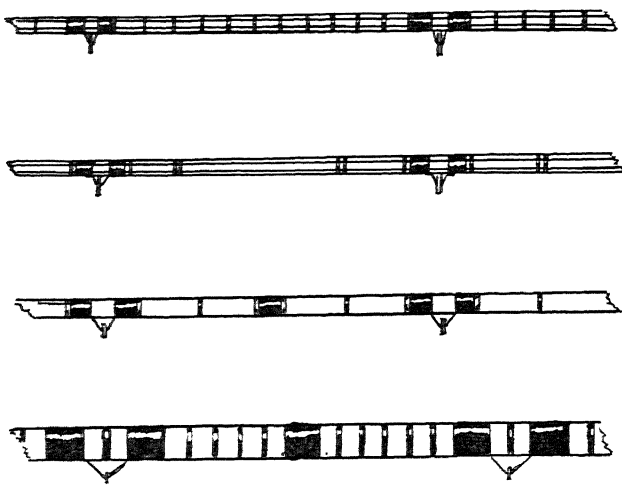


FIG. 49. Some typical binding schemes

off your rod as you go along. Remember that it gives a more artistic appearance if the width and spacing of the bindings decreases progressively towards the tip. However, if you put the same number of bindings between each pair of rings you will achieve this effect automatically, as there is, or should be, a progressive reduction in the spacing of the line-rings.

Fig. 49 shows some typical binding schemes for various rods. You can introduce a two-colour scheme if you wish, but do not overdo it or the effect will be spoiled. Narrow marginal bands of a contrasting colour are all that are needed, on either side of the broader bindings and just above the handle. The choice of colours is, of course, a matter of personal taste. I have done up rods in all colours,

but the rich effect produced by a combination of blue and gold has proved easily the most popular among anglers I have made rods for. The effect would probably make anglers of the 'functional finish' school shudder and it is, in fact, rather too brash for my own taste, but the fact remains that every rod I have whipped in these

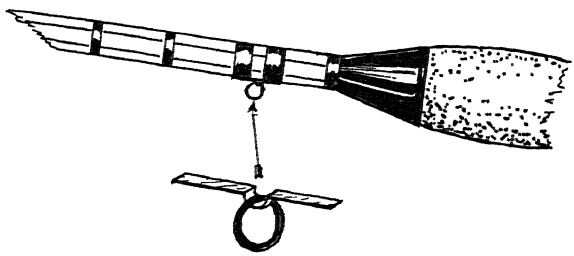


FIG. 50. The keeper ring

colours has inevitably produced numerous requests for rods with similar bindings.

Lastly there is one other item which is useful on any rod, though in the case of commercially-made rods it is usually confined to fly-rods. This is the 'keeper-ring', a small loose ring fitted just above the handle, into which the hook or fly is hitched out of harm's way when not in use. Fig. 50 shows the details of this very useful little fitting.

11

Varnishing

THE secret of good rod-varnishing is patience. You cannot hope for a really 'professional' finish if you start off with ideas of having your rod ready for the week-end. By amateur methods, at least, rod-varnishing is a job which takes time.

There are quick-drying cellulose varnishes available, but I do not recommend them. The trouble is that unless you are very slick the cellulose is drying before you have finished putting it on and the result is anything but satisfactory. Rod-manufacturers use cellulose varnishes successfully, I know, but they have spraying facilities which the amateur does not usually possess. Mind you, cellulose *can* be applied successfully by hand, but it is a tricky business and the beginner is far more likely to achieve satisfactory results with good copal varnish. Copal gives a finish equally as good as cellulose, is more durable, and is certainly easier to apply successfully by hand. But it cannot be properly applied in a hurry.

Where most amateurs go wrong is in trying to put on too much varnish at once. They try to get a satisfactory finish all in one go, which is impossible. To get a really hard glass-like finish the varnish must be built up, coat upon coat. Three coats, at least, are necessary. When copal varnish is put on thickly there is a tendency for it to run and form unsightly blobs and ridges. Apart from this a thick coat never hardens thoroughly. The surface of a thick coat hardens first and forms a thin skin which excludes the air and prevents the layer of varnish underneath from hardening properly. A thin coat hardens right through.

Preparation

No amount of varnish will make a bad surface into a good one. Before any varnish is applied the surface must be smooth and clean. If you have done your work conscientiously your canes will have been polished-up satin-smooth with fine sand-paper before the bindings were put on. The bindings will have had a coat of 'Durofix',

but if they are to look smooth under the varnish further filling will have be to applied to fill up the interstices between the turns of silk.

Filling the bindings

What you use as a filler for the bindings depends upon whether your aim is elegance or utility. If you have limited your whipping to the strictly 'functional' bindings and are not concerned about their colour you can give them a protective coat of beeswax. This treatment is especially suitable for the more husky rods like sea-rods, live-baiting rods and heavy double-handed spinning-rods. The hard film of beeswax makes an excellent protection for the bindings, and though it gives them a bulkier appearance this does not look too obtrusive on these heavier rods.

Some rod-makers wax the thread before it is wound on, but I have always found it more convenient to wax the finished bindings. I do my whipping in the usual way, then on to each binding in turn

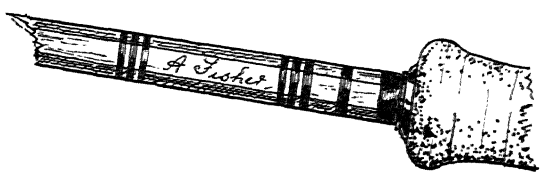


FIG. 51. A name panel

I melt a small blob of beeswax. I then twirl the rod in my fingers and distribute and smooth the wax with a warm knife-blade. There is a knack in this, but you will soon get the hang of it. The secret is to have the knife-blade at just the right heat; just hot enough to soften the wax, but not so hot as to melt it completely and cause it to run.

If you want your bindings to be decorative as well as functional you will have to use a transparent filler which will not obscure the colour of the silk. A couple of coats of thinned-down 'Durofix' will serve, or better still, a coating of one of the transparent fillers which suppliers of rod-making materials sell especially for the job.

If you want to add a little personal touch to your rod now is the time to put on your signature or monogram, in Indian ink, just above the handle. Do it neatly with a fine mapping-pen, or get someone else to inscribe it for you if your penmanship is not very elegant. An artistically-written name bordered on each side with a couple of bands of coloured whipping adds a pleasing touch to any rod.

Applying the varnish

As for applying the varnish, nothing could be simpler. You do not even need a brush, except perhaps a small one of the 'paint-box' type for working into the awkward corners around the rings. You just smear on the varnish with your finger-end, evenly and sparingly. Do the job in a warm, dust-free room. Hang the varnished lengths to dry, also in a room that is warm and free from dust, and leave them for at least two or three days for the varnish to thoroughly harden.

It is not possible to state any definite drying-time, for it may vary considerably according to the temperature, the thickness of the application and the particular brand of varnish used. Some of the proprietary brands of copal varnish have extra drying mediums added which reduce the drying-time considerably, but do not place too much reliance on the claims the manufacturers make on their tins. Do not put on a second coat until the first is really hard and free from the slightest trace of 'tackiness'. Fingering the varnish from time to time is the only way of telling when it is ready for the next coat and there is always the danger that you may finger it prematurely and mark it. A wise plan is to varnish an odd sawn-off end of the rod-material at the same time as you do the rod. This will serve as a 'test-piece' and will save you making any undesirable finger-marks on the rod.

Before you apply a second coat the preceding one must be rubbed down to remove any specks of settled dust and to provide a 'key' for the next coat. This process is important and must not be omitted. Some rod-makers do this 'cutting', as it is called, of varnish undercoats by rubbing them down with a damp cloth and pumice-powder. I have found, however, that it is possible to obtain quite satisfactory results with a very light rub down with the finest grade of abrasive paper obtainable—the kind usually referred to as 'flour' paper. Do not be alarmed about removing the gloss; the next coat will put it back again.

After rubbing down remove every trace of dust by brushing and blowing before you re-varnish, but remember that any dust that goes up has to come down again, so do not do your dusting in the room where you intend to do your varnishing. Apply the second coat as before, but give it rather longer to dry because once the first coat has sealed the grain subsequent coats will take longer to harden. When the second coat is really hard rub down again and apply a third. Three coats will usually produce a satisfactory surface, but if time is no object a fourth coat will make the job all the more durable.

Coloured finishes

My advice with regard to coloured finishes is to forget about them. Leave well alone and stick to the natural colour of the cane. The natural colour looks as attractive as any, and amateur attempts at colouring never seem to quite come up to professional standards.

The trouble is that the hard outer skin of cane does not absorb stains very well. Painting is the only alternative, and amateur painting always seems to produce that undesirable 'home-made' look. Paint your rods, by all means, if you are one of the 'functional finish' school who like their rods a drab, inconspicuous colour, but if it is elegance you want stick to clear copal varnish.

Greenheart

Lastly, a word about finishing greenheart. Greenheart *can* be varnished in the same way as cane, but some of the older generation of anglers who were brought up in the heyday of greenheart rods claim that greenheart is best left in its natural state—unvarnished. Greenheart is practically impervious to water and does not really need the protection of varnish, and one of its drawbacks, in fact, is that it tends to dry out with age and so loses some of its suppleness. This can be prevented by regular dressing with linseed-oil, a treatment which is impossible, of course, if the rod has been varnished.

12

A bag for your rod

EVEN when you have finished a rod there is still a little more work to do. You will need stoppers of some kind to protect the female ends of your joints or ferrules and you will also need a decent bag in which to keep your rod.

Personally I never bother much about fancy ferrule stoppers. They get lost far too easily. Ordinary corks of a suitable size serve the same purpose and can be quickly replaced for nothing. If you keep your eyes open you will be able to pick up corks of various sizes with knurled plastic stops, and if these are reduced with file and sand-paper they will serve as stoppers.

A good rod-bag, however, is a necessity. It is not much use spending weeks imparting a real 'carriage' finish to your rod if you are going to let the various pieces jostle together in a makeshift bag of the draw-string type. What you need is a proper divided bag with a separate compartment for each rod joint. If you can enlist the aid of some good lady with a sewing-machine you should be able to make such a bag for a fraction of the price you would have to pay for one in a shop. This is how to go about it.

Any kind of strong material will do—twill, calico, or even light tent-cloth. Do not worry about getting waterproof material, for it does rods no harm to be wet for short periods and they should never be left in a bag, waterproof or otherwise, when you get them home. For a rod-bag I like a washable material which can be given a run through in the washer when it acquires that distinctive 'river-mud' odour! At least one rod-material supplier sells rod-bag material by the yard at a quite reasonable price, but you can get suitable material even cheaper if you are prepared to jostle with the ladies and rummage on the remnant-stall in the average market. I made three bags from the last piece I picked up, at a cost of less than five shillings for the lot.

Dimensions

The length of your piece of material should be about 9 inches longer than the longest length of your rod. The width will depend, of course, on the type of rod. The easiest way of determining the required width is to pin a dressmaker's tape-measure losely around the joints of the actual rod as in Fig. 52.

Fig. 53 shows the various steps in the making up of the bag. First, fold the material in half lengthwise and make a cut half-way across, 9 inches from the top end, as in Fig. 53(A). A tape binding is sewn on to the raw edges of this cut to reinforce them, and this can be done most conveniently at this stage before the bag is sewn up.

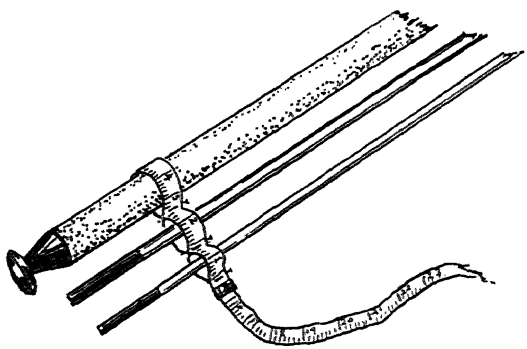


FIG. 52. Measuring required material width for rod-bag

The doubled material is now sewn right around and the resulting bag is then turned inside out so that the raw edges of the seams are inside. (Fig. 53B.) The upper bound edge is then sewn down to make the fold-over flap.

All that remains to do now is to divide up the bag into the required number of compartments. Slip all the pieces of the rod into the bag temporarily and insert rows of pins to indicate the positions of the dividing seams, but make sure that you make the various pockets roomy enough so that the pieces can be slipped in and out with the minimum of fuss and bother.

Run a double seam down each line of pins and your bag is complete except for the attachment of tying-tapes at the points shown. If some of the rod-joints are shorter than others sew some short seams across the lower ends of the compartments, to keep the ends of the various pieces flush with the mouths of their respective pockets. Compartments too long for their contents is a fault with

many commercially made rod-bags, possibly because the makers use a standard bag for several types of rods. When the pockets are overlong the rod-user is tempted to up-end the bag and shake out its contents, a practice which results in mud-filled and often burred-over ferrules.

A few last words of advice. In all your rod-making strive for

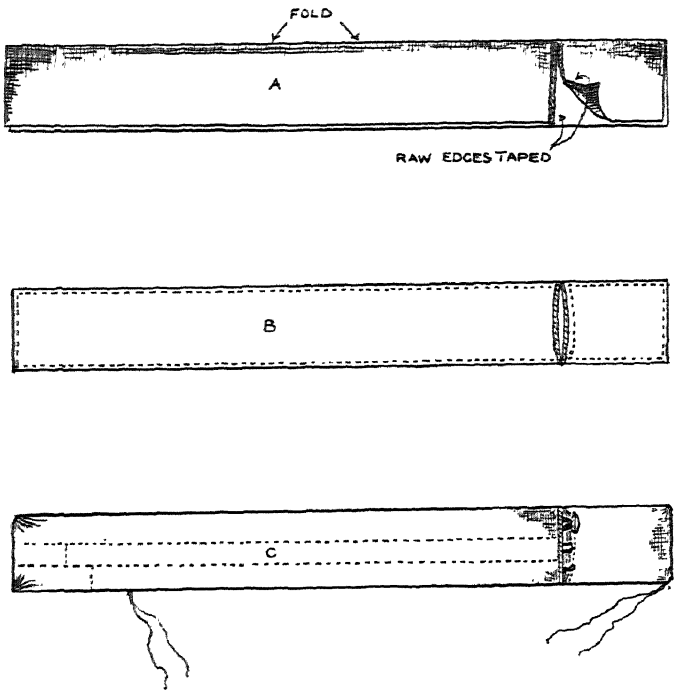


FIG. 53. Steps in making-up the rod-bag

perfection. Study the rods in tackle-shop windows and be determined that you are going to be satisfied with nothing less elegant. If you bungle any operation ruthlessly scrap that particular part and try again. If things are not going right put the job aside for a while and then try again later. Do not be satisfied with any stage of the work until it is as good as you can possibly get it. In short, look upon your rod-making as a pleasant and absorbing craft, and not just as a cheap way of aquiring fishing-rods!

APPENDIX

Some dimensional data

In the chapter on ferruled rods I said that the best way of obtaining the necessary dimensions was to take them from a good existing rod of the type you intend to make. Perhaps I should have said that this is the best way for the experienced angler, who knows what he wants and can choose as a model a rod which is likely to fulfil his requirements. The novice, however, is hardly likely to be able to assess the merits of a rod, and may not even know what *type* of rod he needs for the particular kind of fishing he intends to do.

With this in mind I have decided to add this appendix containing designs for a representative selection of the various types of ferruled rods, together with a few constructional notes and recommendations. I do not claim that the dimensions I give for a rod will produce the *best* rod of that particular type, for too many factors are involved to lay down any *perfect* set of dimensions. It all depends upon the physical build of the angler concerned, the nature of the water he intends to fish and the calibre of the fish he is likely to encounter. These designs will, however, acquaint the beginner with the various types of rods and will provide him with some not-too-difficult models to start on.

Where possible I have tried to avoid rods with complicated compound tapers, designed to impart to the action certain niceties which are, in any case, rarely appreciated by the beginner. These are for the expert. For my examples I have chosen designs which are generally useful, yet easy to make.

Where split-cane is specified the diameters I give are *flat-to-flat* dimensions, as these are the diameters you will have to quote if you buy your split-cane ready-made. If you intend to make your own split-cane, using the little measuring gadget I described in Chapter 5, you will need to halve the diameter given to obtain the necessary flat-to-apex dimensions of the component strips. You need not worry about a few thousandths of an inch or so one way or the other, for it will make little difference, and you cannot hope to work

to precision-engineering tolerances with hand methods and bamboo cane. There are slight variations even in shop-bought rods.

If you are ordering ready-made split-cane state the lengths required and the flat-to-flat end-diameters. (Unless you are prepared to pay dearly for it you will have to be content with standard tapers.) Also state the type of rod for which the cane is required, so that the dealer can send you the standard taper best suited to your needs.

If you wish you can use greenheart sections or suitable fibre-glass blanks as a substitute for split-cane, but it must be remembered that if the dimensions are the same these materials usually give a rod slightly less powerful than the split-cane model.

In the matter of fittings you can, of course, please yourself. I show the rods as I would make them. If you wish to save yourself a few shillings you can dispense with such refinements as butt-cappings, shoulder-collars and sleeved reel-fittings. They are not really essential, but I find that if you try to sell a rod these fittings enhance the value of a rod to an extent far greater than their initial cost.

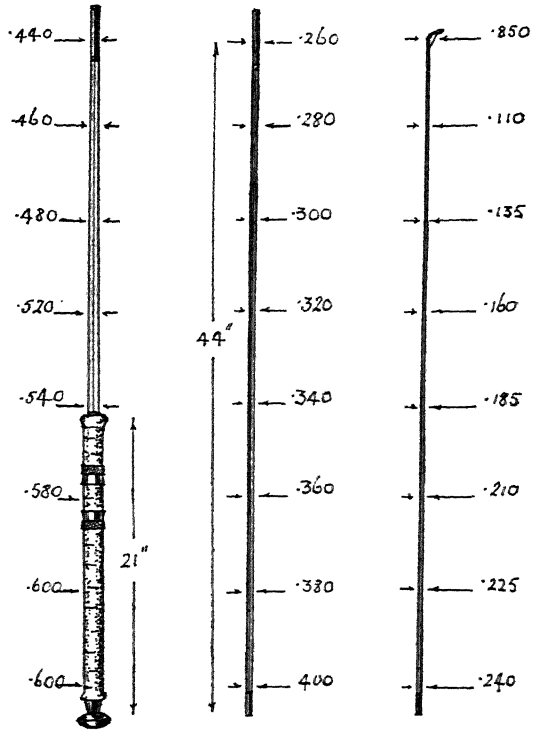


FIG. 54. Rod No. 1—11-foot Avon-type or 'trotting' rod

This is primarily a float-fishing rod, though it can be used for very light ledger-fishing. The sharp tip-action of the match-type rod is ideal for light float-fishing at fairly close quarters, but at greater range (such as when 'trotting' a float for some considerable distance down-stream) this tip-action ceases to be really efficient. To strike effectively with a long line out the rod needs a greater degree of flexibility. The 'Avon' rod has been evolved to fulfil this requirement.

Material

The rod shown is of average dimensions and is made entirely of split-cane with straight tapers, the diameters given being at 6-inch intervals. A saving in cost can be made, however, by using whole Tonkin cane for the butt-length. This is often done in the case of commercially-made rods, without affecting the efficiency of the rod

to any great extent. A Tonkin cane 44 inches long tapering from about $\frac{5}{8}$ inch to a bare $\frac{1}{2}$ inch would serve.

Handle

This is built up from bored cork bungs with $\frac{1}{2}$-inch bore, the holes being opened out with a round file to fit the thicker parts of the butt. Plain reel-fittings are quite satisfactory.

Ferrule sizes

Butt-to-middle — $\frac{7}{16}$ inch.
Middle-to-top — $\frac{1}{4}$ inch.

Rings

High 'Bell's Life', 8 in number, and 'stand-off' type tip-ring. Tip- and butt-rings should preferably be synthetic-agate lined. Ring spacing (from tip) 8″ – 9″ – 10″ – 11″ – 12″ – 14″ – 16″ – 18″.

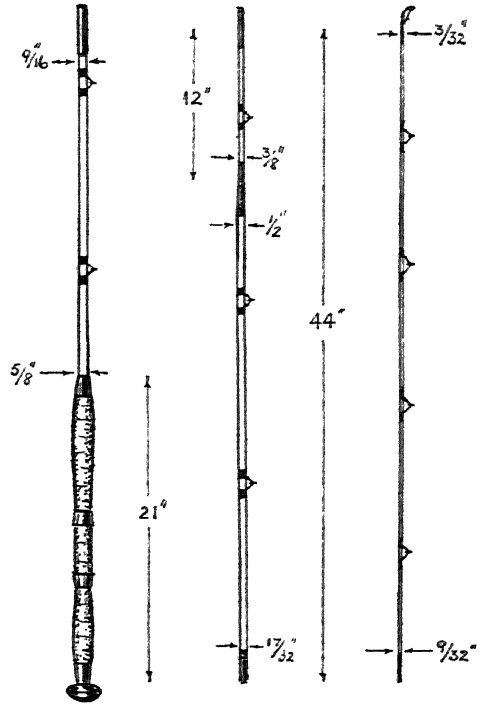


FIG. 55. Rod No. 2—11-foot general purpose rod

Actually there is no such thing as a general purpose rod, for it is impossible to design a rod suitable for every kind of fishing. The so-called 'general purpose' rod is really an attempt to combine the qualities of the match-type and 'Avon' rods, its action being somewhere between the two. Although it is a very popular type it is not a rod that I like, for it is of necessity a compromise and is not ideal for either job. However, it is perhaps a good choice for the one-rod man who wishes to do both still-water and river float-fishing.

Material

The butt and middle lengths are of whole Tonkin cane. The butt-length is a single cane 44 inches long; the middle is made up of a 14-inch length spliced to a depth of 2 inches into a 32-inch cane. The top is of split-cane, straight taper.

Handle
Built up from bored corks, $\frac{1}{2}$-inch bore. Plain reel-fittings.

Ferrule Sizes
Butt-to-middle — $\frac{9}{16}$″.
Middle-to-top — $\frac{5}{16}$″.

Rings
High 'Bell's Life', 9 in number. Stand-off tip-ring. Ring spacing (from tip): 8″ – 9″ – 10″ – 11″ – 12″ – 13″ – 14″ – 15″ – 16″.

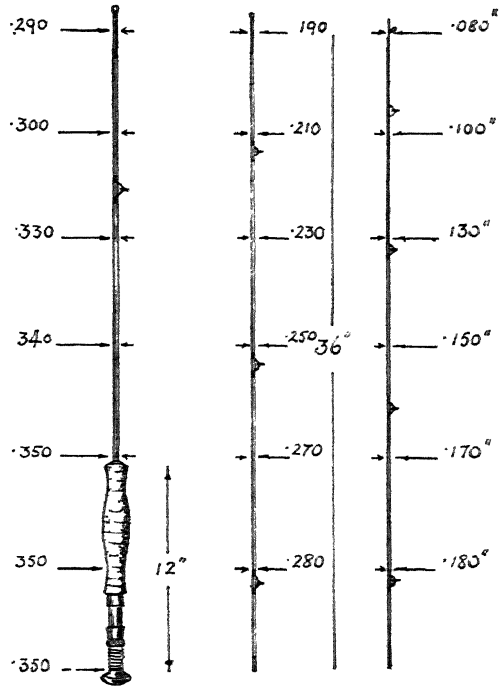


FIG. 56. Rod No. 3—9-foot dry-fly rod

No other type of rod has so many variations as the fly-rod. They are made in various lengths, with quite a wide range of 'actions'. The rod shown is a typical example; a nine-footer with a stiffish dry-fly action.

Material
All split-cane. Diameters given are at 6-inch intervals.

Handle
Built up from bored cork rings $\frac{5}{16}$-inch bore and shaped if desired. Screwed-sleeve reel-fitting.

Ferrules
Lightly reinforced split-ended.

Sizes

Butt-to-middle — $\frac{9}{32}''$.
Middle-to-top — $\frac{3}{16}''$.

Rings

Agate-lined tip-ring and 8 'Full-open' bridge rings. Butt-ring also agate-lined.
Spacing (from tip): 5″ – 8″ – 9″ – 10″ – 11″ – 12″ – 13″ – 16″.

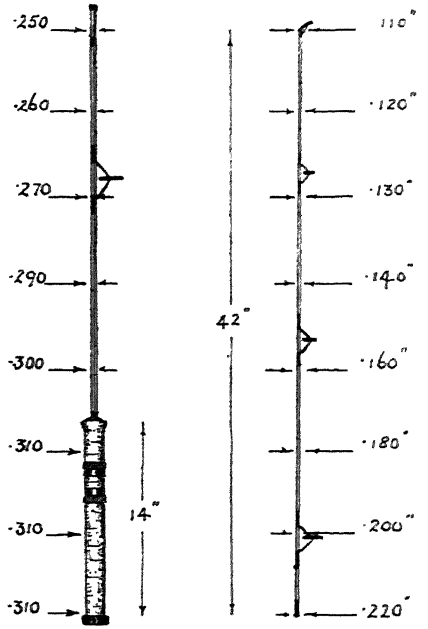


FIG. 57. Rod No. 4—7-foot light spinning or thread-line rod

This is the most popular type of spinning-rod and is probably the most abused. As its name implies, it is a *light* spinning-rod, and is suitable only for casting the lighter spinning lures in conjunction with lines of from 4–6 lb. breaking strain. For the heavier artificial lures and live or dead natural baits a double-handed rod like Rod No. 5 or the modified version of Rod No. 6 is preferable.

Material
Split-cane throughout. Diameters given are at 6-inch intervals.

Handle
Made up of bored cork rings, $\frac{5}{16}$-inch bore. Plain reel-fittings, or preferably a screwed-sleeve reel-fitting.

Ferrule
Split-ended reinforced. Size $\frac{1}{4}$ inch.

Rings
Synthetic-agate lined tip-ring and 4 'Full-open' bridge rings of stainless steel or chromed nickel. Butt-ring should be of large diameter (about 25 mm.)
Spacing (from tip): 10″ – 12″ – 14″ – 16″.

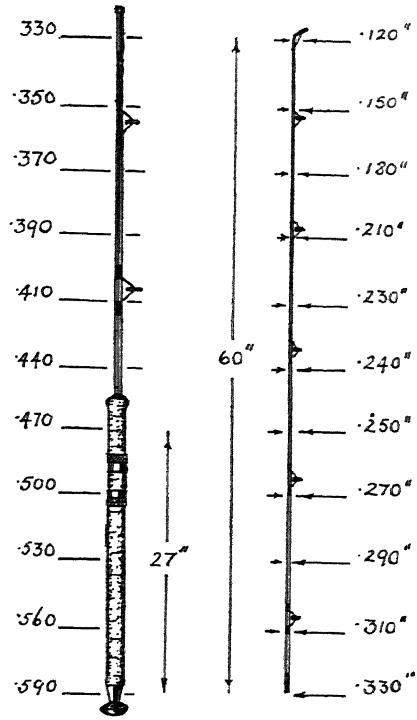


FIG. 58. Rod No. 5—10-foot ledger or double-handed spinning-rod

The dimensions I give here are those of a rod which I originally adapted for a friend from the two upper lengths of a massive 15-foot double-handed salmon-rod. The dimensions follow very closely those of the well-known Walker Mark IV Carp-rod, though the Mark IV is slightly more powerful as it is stiffened considerably by incorporating a false wood butt of larger diameter underneath the handle-corks.

Material
Split-cane throughout. Diameters are at 6-inch intervals.

Handle
Of bored cork bungs, $\frac{7}{16}$-inch bore. Knurled Duralumin reel-fittings suitable if for ledger-fishing. Screwed-sleeve fitting preferable for spinning purposes.

Ferrule
Reinforced, split-ended. Size $\frac{11}{32}$ inch.

Rings
Agate-lined tip-ring and 7 'Full-open' bridge rings of stainless steel or chrome nickel. Butt-ring 25 mm. diameter.
Spacing (from tip): 7″ – 10″ – 11″ – 12″ – 13″ – 15″ – 17″.

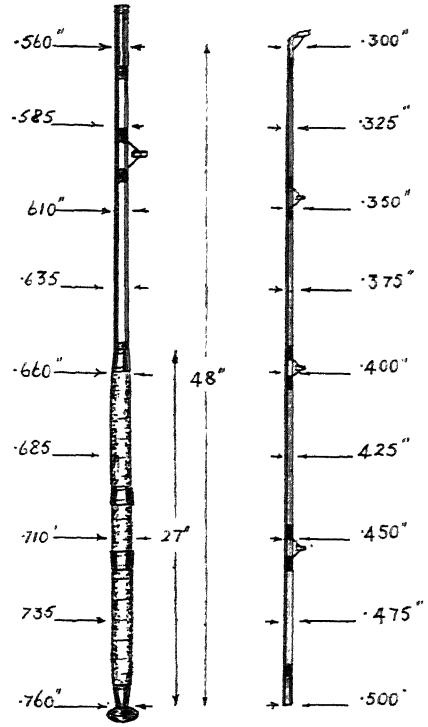


FIG. 59. Rod No. 6—8-foot sea or heavy live-bait pike rod

Though not as stout as some sea-rods this is a really powerful rod capable of casting fairly heavy leads and large live or dead baits.

Material

It is built up of split-cane throughout, the lower piece being double-built to achieve the necessary diameter. Diameters given are at 6-inch intervals.

Handle

Built up from bored corks, $\frac{5}{8}$-inch bore opened out to suit. Plain reel-fittings, or alternatively a sliding sleeve-fitting half-way along the handle. If for salt-water use all fittings must be of *brass*. Dur-alumin is liable to corrosion unless heavily anodized.

Ferrule
Stout gauge heavily reinforced splint-ended. Size $\frac{9}{16}$ inch.

Rings
Guarded porcelain rings of generous diameter throughout, or alternatively, heavy brass or stainless steel 'double upright'. Ring spacing (from tip): 13″ – 14″ – 15″ – 16″.

Some alternative dimensions
A somewhat lighter construction will give a less powerful rod suitable for heavy spinning for salmon or pike. For this the diameters at 6-inch intervals should be:

0″ – ·500″	54″ – ·330″
6″ – ·475″	60″ – ·310″
12″ – ·450″	66″ – ·290″
18″ – ·425″	72″ – ·270″
24″ – ·400″	78″ – ·250″
30″ – .390″	84″ – ·220″
36″ – ·380″	90″ – ·190″
42″ – ·370″	96″ – ·160″
48″ – ·350″	

Ferrule size—$\frac{11}{32}$ inch.

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